

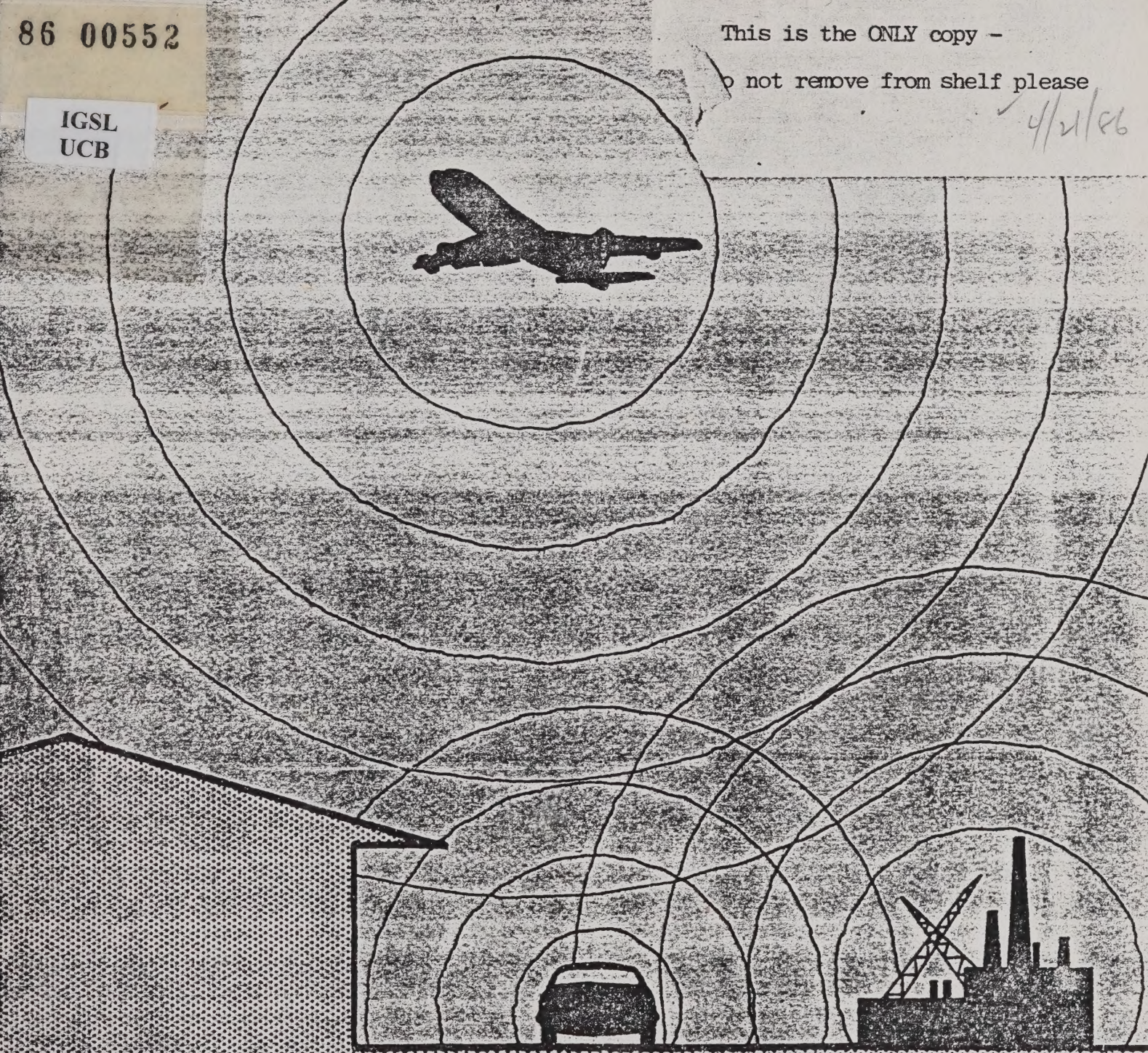
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PREFACE

In August, 1975, M.A.G. Consultants submitted to the City of Alameda three volumes comprising the Noise Element, Technical Report and Environmental Impact Report on the Noise Element. Primarily due to extensive supplementary guidelines for the Noise Element proposed by the California Office of Noise Control, the City determined that the M.A.G. three volumes should be edited and revised.

In January, 1976, the City retained Williams and Mocine to prepare the Noise Element of the General Plan. Robert L. Ironside was the partner in charge of the assignment. Concurrently, Wyle Research was retained by the City to prepare a CNEL Contours Study for Metropolitan Oakland International Airport.

In preparing the Noise Element, Williams and Mocine utilized the following general approach:

- Follow the procedure outlined in the State Guidelines and Office of Noise Control's Technical Supplement.
- Incorporate technical data and conclusions from the M.A.G. and Wyle reports.
- Reorganize, revise and retain appropriate sections of the M.A.G. reports, particularly "Goals and Policies" and "Mitigating Measures for Noise Control" (previously titled "A Plan For Reduction of Noise-Exposure Levels in Alameda").
- New material was drafted where dictated by professional judgment or a need to conform to the Technical Supplement.

TABLE OF CONTENTS

| | <u>Page</u> |
|--|-------------|
| INTRODUCTION | 1 |
| NOISE IN ALAMEDA | 12 |
| FUTURE NOISE | 29 |
| GOALS AND POLICIES | 46 |
| MITIGATING MEASURES FOR NOISE CONTROL | 50 |
| NOISE CRITERIA FOR LAND USE PLANNING | 83 |
| RELATIONSHIP WITH COMPREHENSIVE PLANNING | 92 |
| RELATIONSHIP OF THE NOISE ELEMENT TO THE CALIFORNIA ENVIRONMENTAL QUALITY ACT | 94 |

LIST OF ILLUSTRATIONS

| | |
|--|-------|
| TYPICAL OUTDOOR NOISE ENVIRONMENTS | 2 |
| ACOUSTICAL SCALE | 3 |
| NEIGHBORHOOD MAP AND REGIONAL SETTING | 13 |
| ALAMEDA NOISE SURVEY | 14 |
| GROUND SOURCE NOISE EXPOSURE LEVELS MAP | 17 |
| AIRCRAFT NOISE EXPOSURE LEVELS MAP | 20 |
| OAKLAND AIRPORT CNEL CONTOURS MAPS | 23-25 |
| 1975 ALAMEDA POPULATION SUBJECT TO VARIOUS CNEL | 28 |
| SAN FRANCISCO AIRPORT CNEL CONTOUR PROJECTION MAPS | 37-39 |
| OAKLAND AIRPORT PRESENT AND FUTURE CNEL MATRIX | 39a |
| OAKLAND AIRPORT FUTURE CNEL CONTOURS MAPS | 40-42 |
| 1995 ALAMEDA POPULATION SUBJECT TO VARIOUS CNEL | 45 |
| COMMUNITY NOISE LAND USE COMPATIBILITY | 86 |
| ALLOWABLE MAXIMUM INTERIOR NOISE LEVEL | 87 |
| COMMUNITY NOISE ENVIRONMENTS MAP | 91 |

INTRODUCTION

NOISE AND ITS EFFECTS

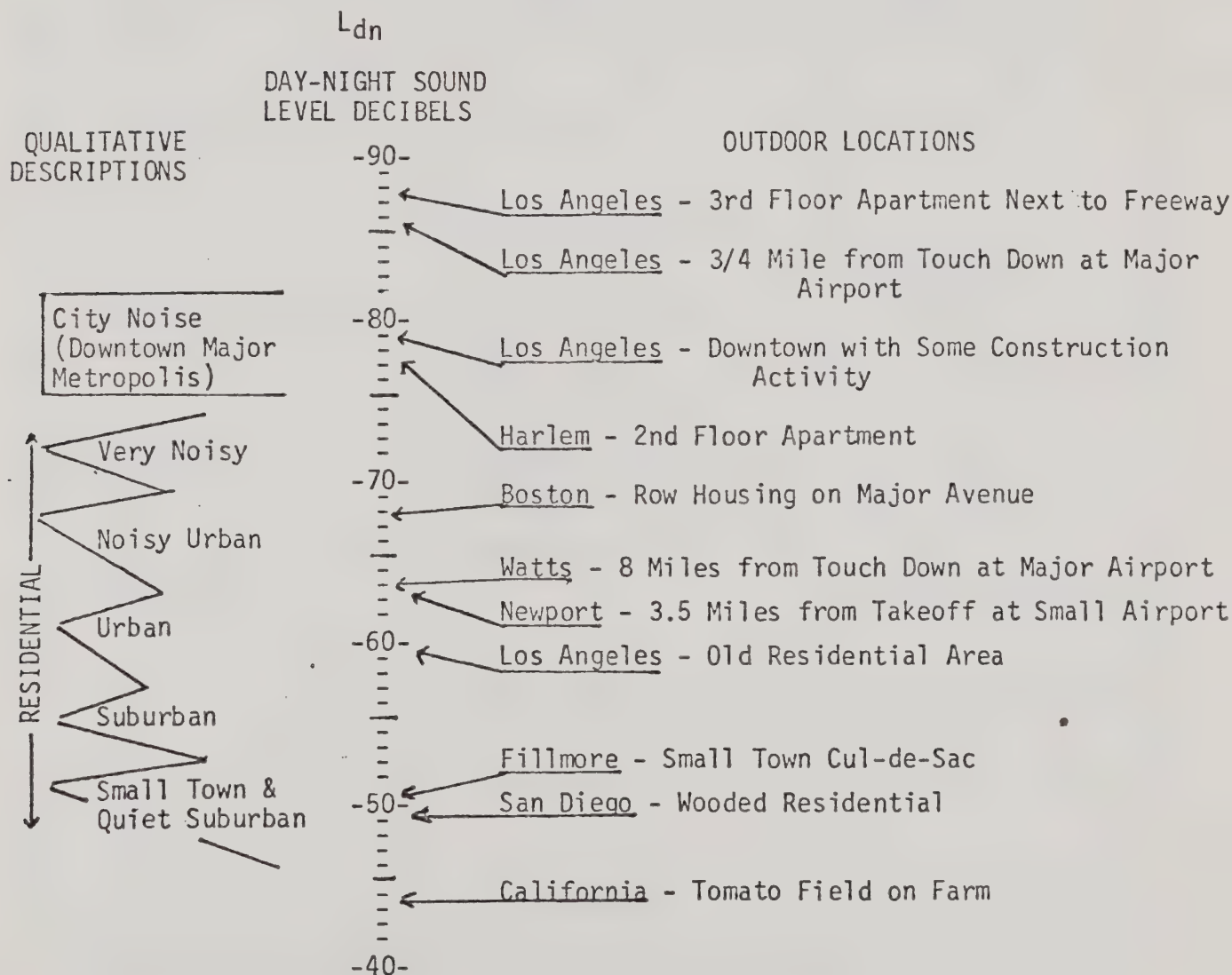
Noise is defined as sound that is annoying or which has a detrimental effect on human physiologic or psychologic processes. Effects of some sounds are more adverse than others; the most annoying sounds are the loudest and highest pitched. Intermittent and irregular sound is also very disturbing. The more random a sound occurrence, the more irritating it becomes. Noise from an uncertain cause, a hidden or moving source, is more annoying than readily identifiable noise. An unexpected loud sound, such as a sonic boom, which startles the hearer, is extremely disturbing. People seldom object to the constant low-level noise of a residential neighborhood or to the noise they generate themselves but noise which is inappropriate to one's activity becomes obtrusive and annoying. In short, noise is unwanted sound.

Some authorities state that the overall noise level of the United States has increased one decibel every year for the past 25 years. In terms of perceived noise, this is about a seven-times increase in 25 years. The increase is astounding but believable considering the increase in population and in the number of new noise-making items which have come into common usage during the period. For example, an electric typewriter produces 60 decibels, a garbage disposal, 80 decibels and a plane 1,000 feet overhead, 85 decibels.* None of these was common 25 years ago. Increased noise seems an undesirable by-product of modern living. The accompanying chart relates typical indoor and outdoor noise to the human response to the noise.

The United States Environmental Protection Agency states that permanent hearing loss may occur with exposure to sound levels of 70 or more decibels*

* See definitions, for dBA scale. Normal conversation at 12 feet from speaker is approximately 50 dBA. For additional information of decibel readings, see Acoustical Scale.

RANGE OF TYPICAL OUTDOOR NOISE ENVIRONMENTS
EXPRESSED IN TERMS OF DAY NIGHT SOUND LEVEL (L_{dn}), dB*



* From: Technical Supplement to Noise Element Guidelines; California Office of Noise Control, February, 1976.

ACOUSTICAL SCALE

| dB | HUMAN RESPONSE | OUTDOOR | INDOOR |
|-----|----------------------|-------------------------|---------------------|
| 160 | Lethal | | |
| 155 | | | |
| 150 | | | |
| 145 | | | |
| 140 | Painfully Loud | sonic boom | |
| 135 | | | |
| 130 | | | |
| 125 | | jet take-off at 200' | |
| 120 | | | oxygen torch |
| 115 | | | discotheque |
| 110 | Physical Discomfort | motorcycle at 20' | |
| 105 | | | |
| 100 | | power mower | |
| 95 | | diesel pump at 100' | |
| 90 | | freight train at 50' | food blender |
| 85 | Annoying | overhead plane at 1000' | |
| 80 | | freeway traffic at 50' | alarm clock |
| 75 | | | |
| 70 | | average traffic at 100' | vacuum cleaner |
| 65 | | | electric typewriter |
| 60 | Intrusive | | |
| 55 | | | |
| 50 | | | normal conversation |
| 45 | | light traffic at 100' | refrigerator |
| 40 | | | |
| 35 | | | whispering |
| 30 | | | |
| 25 | Quiet | | |
| 20 | | | |
| 15 | | leaves rustling | |
| 10 | | | |
| 5 | | | |
| 0 | Threshold of Hearing | | |

over a long period of time. Approximately one in ten Americans suffers some measurable hearing loss partly because of such exposure.

Noise also interferes with safety and communication, causes undue stress and reduces the quality of life. Additionally, economic values may be affected by noise. A noisy area is less desirable than a quiet place within which to live, work and play. Reduced property values or added costs for acoustical insulation may result from noise. A noisy environment also lowers productivity of workers.

The effects of noise have become so serious that there is widespread public interest in controlling and reducing unnecessary sound; as a result, there is a State mandate to include a Noise Element in the General Plan.

PURPOSE OF THE NOISE ELEMENT*

The Noise Element of the General Plan provides a basis for comprehensive local programs to control and abate excessive environmental noise. The fundamental goals of the Noise Element are:

- To provide sufficient information concerning the community noise environment so that noise may be effectively considered in the land use planning process. In so doing, the necessary groundwork will have been developed so that a community noise ordinance may be utilized to resolve noise complaint situations.
- To develop strategies for abatement of excessive noise exposure situations involving implementation of cost-effective mitigating measures in combination with re-zoning as appropriate to avoid incompatible land uses.
- To protect those existing regions of the study area whose noise environment are deemed acceptable and also those locations throughout the community deemed "noise sensitive."

* From: Technical Supplement to Noise Element Guidelines; California Office of Noise Control, February, 1976.

- To utilize the definition of the community noise environment, in the form of CNEL or L_{dn} noise contours as provided in the Noise Element for local compliance with the State Noise Insulation Standards. These standards require specified levels of outdoor to indoor noise reduction for new multi-family residential constructions in areas where the outdoor noise exposure exceeds CNEL (or L_{dn}) 60 dB.

NOISE ELEMENT REQUIREMENTS

Government Code Section 65302 (g). As amended by Senate Bill 860 (Beilenson, 1975).

A noise element which shall recognize guidelines adopted by the Office of Noise Control pursuant to Section 39850.1 of the Health and Safety Code, and which quantifies the community noise environment in terms of noise exposure contours for both near and long-term levels of growth and traffic activity. Such noise exposure information shall become a guideline for use in development of the land use element to achieve noise compatible land use and also to provide baseline levels and noise source identification for local noise ordinance enforcement.

The sources of environmental noise considered in this analysis shall include, but are not limited to, the following:

1. Highways and freeways.
2. Primary arterials and major local streets.
3. Passenger and freight on-line railroad operations and ground rapid transit systems.
4. Commercial, general aviation, heliport, helistop, and military airport operations, aircraft overflights, jet engine test stands, and all other ground facilities and maintenance functions related to airport operation.
5. Local industrial plants, including, but not limited to, railroad classification yards.
6. Other ground stationary noise sources identified by local agencies as contributing to the community noise environment.

The noise exposure information shall be presented in terms of noise contours expressed in community noise equivalent level (CNEL) or day-night average level (Ldn). CNEL means the average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five decibels to sound levels in the evening from 7 p.m. to 10 p.m. and after addition of 10 decibels to sound levels in the night before 7 a.m. and after 10 p.m. Ldn means the average equivalent A-weighted sound level during a 24-hour day, obtained after addition of 10 decibels to sound levels in the night before 7 a.m. and after 10 p.m.

The contours shall be shown in minimum increments of 5 dB and shall continue down to 60 dB. For areas deemed noise sensitive, including, but not limited to, areas containing schools, hospitals, rest homes, long-term medical or mental care facilities, or any other land use areas deemed noise sensitive by the local jurisdiction, the noise exposure shall be determined by monitoring.

A part of the noise element shall also include the preparation of a community noise exposure inventory, current and projected, which identifies the number of persons exposed to various levels of noise throughout the community.

The noise element shall also recommend mitigating measures and possible solutions to existing and foreseeable noise problems.

The state, local, or private agency responsible for the construction, maintenance, or operation of those transportation, industrial, or other commercial facilities specified in paragraph 2 of this subdivision shall provide to the local agency producing the general plan, specific data relating to current and projected levels of activity and a detailed methodology for the development of noise contours given this supplied data, or they shall provide noise contours as specified in the foregoing statements.

It shall be the responsibility of the local agency preparing the general plan to specify the manner in which the noise element will be integrated into the city or county's zoning plan and tied to the land use and circulation elements and to the local noise ordinance. The noise element, once adopted, shall also become the guidelines for determining compliance with the State's Noise Insulation Standards, as contained in Section 1092 of Title 25 of the California Administrative Code.

NOISE MEASUREMENT

The basis for determination of noise compatible land use are contours of equal energy noise exposure expressed in terms of Community Noise Equivalent

Level (CNEL) or Day-Night Average Level (L_{dn}). Though much time and effort may go into development of these contours which, in some instances, utilize rather sophisticated digital programming techniques in their generation, the present State-of-the-Art is such that their accuracy is usually no better than ± 3 dB. In fact, the accuracy of the noise exposure prediction decreases with increasing distance away from the noise source. In the near vicinity of the source, prediction accuracy may be within the range of ± 1 dB, while at greater distances this may deteriorate to ± 5 dB or greater. At greater distances, meteorological and topographic effects, typically not totally accounted for in most models, may have significant influence, thereby affecting the prediction accuracy. Thus, when dealing with the concept of noise contours, it is best not to think of them as an absolute line of demarcation on a map (such as topographic contours), but rather as bands of similar noise intensity, usually on the order of 5 dB wide.

DEFINITIONS*

Decibel, dB: A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

A-Weighted Sound Level: The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

L_{10} : The A-weighted sound level exceeded 10 percent of the sample time. Similarly, L_{50} , L_{90} , L_{99} , etc.

* From: Technical Supplement to Noise Element Guidelines; California Office of Noise Control, February, 1976.

| | |
|--|--|
| Equivalent Energy Level, <u>L_{eq}</u> : | The sound level corresponding to a steady state sound level containing the same total energy as a time varying signal over a given sample period. <u>L_{eq}</u> is typically computed over 1, 8, and 24 hour sample periods. |
| <u>CNEL</u> : | Community Noise Equivalent Level. The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five decibels to sound levels in the evening from 7 p.m. to 10 p.m. and after addition of 10 decibels to sound levels in the night before 7 a.m. and after 10 p.m. |
| <u>L_{dn}</u> : | Day-Night Average Level. The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of 10 decibels to sound levels in the night before 7 a.m. and after 10 p.m. <u>Note:</u> CNEL and L _{dn} represent daily levels of noise exposure averaged on an annual basis, while <u>L_{eq}</u> represents the equivalent energy noise exposure for a shorter time period, typically one hour. |
| Noise Exposure <u>Contours</u> : | Lines drawn about a noise source indicating constant energy levels of noise exposure. CNEL and L _{dn} are the metrics utilized herein to describe community exposure to noise. |
| Ambient <u>Noise Level</u> : | The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location. |

Intrusive
Noise:

That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency and time of occurrence, and tonal or informational content as well as the prevailing ambient noise level.

Equal
Noisiness
Zones:

Defined areas or regions of a community wherein the ambient noise levels are generally similar (within a range of 5 dB). Typically, all sites within any given noise zone will be of comparable proximity to major noise sources.

EFFECTS OF STRUCTURES AND VEGETATION

Surface noise contours are drawn for a natural ground surface and do not take into account the extent that noise levels are attenuated by structures and vegetation. The problem with taking these factors into account is extremely complex: A building, for example, may intercept and reduce noise in one direction but may also reflect and augment noise in another direction.

In general terms, the order of magnitude of urban influences upon sound propagation may be illustrated by the following examples:

- Scattered individual small houses have no identifiable significant shielding effect on noise exposure levels at areas farther away from the source.
- Regularly arranged rows of individual houses, occupying 40 percent to 60 percent of the length of the row will provide about 3 dB of noise reduction for similar houses in the second row away from the source. Houses occupying 70 percent to 90 percent of the row will provide about 5 dB reduction for similar houses in the second row away from the source.
- Similar houses in third and subsequent rows will be afforded about the same degree of noise reduction up to ten decibels.
- Continuous, connecting or nearly connecting rows of buildings can act as shielding barriers reducing noise at the next row away from the source as much as 20 dB, or as little as 5 dB, depending upon the heights and configurations of the respective buildings.
- Only a broad belt of dense forestation is likely to act as an effective noise shield. A depth of about 100 feet of fully crowned trees and dense underbrush will reduce noise about 5 dB; 500 feet of comparable forestation will decrease noise about 10 dB.

SUMMATION OF NOISE LEVELS

In order to assess the "noisiness" of an area, it is necessary to add the level of surface noise to the level of aviation noise. By overlaying the surface and air noise contours, total noisiness can be calculated by using the following table:

| <u>Difference Between Higher and Lower Levels</u> | <u>Number to Add to the Higher Noise Level</u> |
|---|--|
| 0 dB | 3.0 dB |
| 1 | 2.5 |
| 2 | 2.1 |
| 3 | 1.8 |
| 4 | 1.5 |
| 5 | 1.2 |
| 6 | 1.0 |
| 7 | 0.8 |
| 8 | 0.6 |
| 9 | 0.5 |
| 10 | 0.4 |
| +10 | negligible |

NOISE IN ALAMEDA

The noise environment of the City of Alameda was evaluated from two points of view: the perception of noise, as expressed by residents in a Citywide survey; and the presence of noise, as measured and calculated by acoustical techniques. The results of these two methods indicate that although aircraft noise is disturbing, highway generated noise is the most dominant source of noise in the City. These conclusions are illustrated in the table summarizing community perception of aircraft noise and in the maps depicting noise levels generated by aircraft and surface sources.

COMMUNITY SURVEY

As part of a Citywide Goals Study, a questionnaire was mailed to every household in Alameda in the Fall of 1974. The results of the mailing were tabulated and verified by personal interviews with a representative sample of residents. In a series of questions, residents were asked to express their opinion of the major problems in the City of Alameda. Those commenting on noise, particularly aircraft noise, were tabulated by neighborhood, as shown in the accompanying table. Based on the attitudes expressed, the neighborhoods most disturbed by noise are: Bay Farm Island, Ballena Bay and West End. Citywide, about one-third of the population feels that aircraft noise is a major problem; about seven percent feel aircraft noise is the most important problem in the City.

EXISTING NOISE LEVELS

The 1975 noise levels in Alameda were determined through a combination of monitoring and arithmetical conversion techniques applied to operational data. The resulting conclusions are illustrated on the accompanying maps which depict areas of equal noisiness from surface and air sources.* The maps show noise

* The surface noise contours are drawn for a natural ground surface, not taking into account structures and dense vegetation. Effects of structures and vegetation are described on page 10.

NEIGHBORHOODS

1. West End
2. Ballena Bay
3. South Shore
4. South Central
5. North Central
6. East End
7. Bay Farm Island
8. Naval Air Station

ONE MILE



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REGIONAL SETTING

CITY OF ALAMEDA NEIGHBORHOOD MAP

METROPOLITAN
OAKLAND
INTERNATIONAL
AIRPORT

ALAMEDA NOISE SURVEY
Extracted from Citywide Goals Study Questionnaire, 1974

| Question | Place of Residence | | | | | | | | |
|----------|--------------------|----------|-------------|-------------|---------------|---------------|----------|-----------------|-------------------|
| | Total Persons | West End | Ballena Bay | South Shore | South Central | North Central | East End | Bay Farm Island | Naval Air Station |
| 85 | | | | | | | | | |
| # | 2,341 | 349 | 113 | 324 | 437 | 219 | 417 | 387 | 38 |
| % | 34.4 | 42.5 | 53.1 | 30.5 | 30.8 | 31.5 | 25.1 | 61.7 | 31.9 |
| 86 | | | | | | | | | |
| # | 461 | 68 | 34 | 63 | 65 | 28 | 41 | 138 | 11 |
| % | 7.4 | 8.7 | 17.1 | 6.5 | 5.2 | 4.4 | 2.7 | 23.5 | 10.1 |
| 87 | | | | | | | | | |
| # | 495 | 77 | 31 | 68 | 79 | 39 | 79 | 108 | 4 |
| % | 8.6 | 10.6 | 16.9 | 7.7 | 6.7 | 6.5 | 5.6 | 19.6 | 4.0 |
| 88 | | | | | | | | | |
| # | 440 | 72 | 18 | 68 | 80 | 47 | 83 | 53 | 10 |
| % | 8.7 | 11.4 | 11.8 | 9.0 | 7.8 | 8.7 | 6.5 | 10.9 | 11.5 |
| 89 | | | | | | | | | |
| # | 86 | 17 | 6 | 11 | 17 | 5 | 11 | 15 | 1 |
| % | 5.2 | 8.9 | 15.0 | 4.4 | 4.5 | 2.9 | 2.6 | 9.9 | 5.0 |
| 96 | | | | | | | | | |
| # | 238 | 34 | 10 | 47 | 29 | 23 | 27 | 57 | 7 |
| % | 5.3 | 6.5 | 8.1 | 6.9 | 3.1 | 4.8 | 2.4 | 13.5 | 10.1 |

Questions

- Q. 85: Which do you feel are major problems in Alameda - aircraft noise as a res
- Q. 86: Major problems in Alameda - most important - aircraft noise as the respons
- Q. 87: Same as #86 only - noise as second most important.
- Q. 88: Same as #85 and #86 - noise as third most important.
- Q. 89: Comments on problems in Alameda - aircraft noise / noise pollution.
- Q. 96: What is most important problem in Alameda - noise as response.

contours which are lines connecting areas of equal Community Noise Equivalent Levels (CNEL). The contour lines range from plus 75 "A" weighted decibels (dBA) down to 60 for aircraft noise and surface noise. In terms of geographic area and in numbers of people affected, surface noise has the greater impact.

Surface Noise

The primary source of surface noise in Alameda is the arterial street system composed of: Main, Webster, Park, Tilden Way, Broadway, High, Buena Vista, Santa Clara, Central - Encinal, Westline, Otis and Maitland. Since there is a direct relationship between traffic volume and noise, the arterial streets are the noisiest; and people located near the busiest segments of these streets are affected to the greatest degree.

In addition to the noise from vehicular traffic, the northern edge of the City, along the Estuary, is affected by noise generated in the industrial areas and from the generalized sources across the water in Oakland.

Railroad Noise

Railroad noise is experienced in Alameda but to a lesser extent than noise from other surface sources. Primarily the railroad noise emanates from the main line and switching yards across the Estuary in Oakland.

Train activity in Alameda is limited to a switching operation of 30-50 cars a day. The cars are delivered to the Alameda Belt Line yard at the foot of Sherman Street by the Southern Pacific railroad. A speed limit of 15 m.p.h. is imposed throughout the City and 9 m.p.h. on Clement Street. Cars go to Del Monte, Encinal Terminals and U.S. Steel. One 1,000 h.p. engine is used. Much of the activity is in the evening or night hours.

Typically car noise level at 50 mph amounts to about 85 dB at a distance of 100 feet from the track. A doubling of train speed adds 6 dB; a halving of train speed subtracts 6 dB. Engine noise generally is independent of train speed but is substantially dependent upon track grade and power acceleration. On a level grade and relatively low power setting, engine noise is less than noise from the cars. In addition to noise from the engine and cars, horn signals produce maximum A-weighted sound levels of up to 70 dB at a distance of 100 feet.

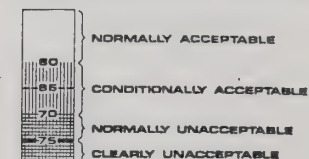
The CNEL values for railroad noise within the City of Alameda have been calculated at 59.2 dB at a distance of 100 feet from the tracks, decreasing to 46.8 dB 800 feet from the tracks. On the Fruitvale Bridge, the CNEL values for one evening train are 84.2 dB at 100 feet and 71.8 dB at 800 feet.

Although the CNEL of railroad noise in Alameda is relatively low, due to the infrequency of train movements, the impact of a single train is appreciable, in excess of 105 dB at a distance of 50 feet.

Single Event Noise

When dealing with noise on the basis of CNEL, an annual average, there is the danger of overlooking excessive single event noise which may cause even more annoyance than noise which is more continuous at a lower level. Major contributors to single event noise are aircraft, trucks, busses, hot rods and motorcycles. The last two mentioned cause particular problems since, to some of those who operate these vehicles, the generation of noise is an important part of the enjoyment derived from these vehicles. Although motorcycles and hot rods are not noisy per se, they are easily altered to emit noise which exceeds legal limits.

ACCEPTABILITY FOR NOISE-SENSITIVE LAND USES



Boundary of area where aircraft-generated CNEL exceeds 85dB.
(See page 88.)

<: Less than

>: More than

—65—
—75— CNEL contours

Numbers refer to CNEL in decibels as determined by M.A.G. Consultants, Inc. and Wyle Research.



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Map corrected August 20 1975

CITY OF ALAMEDA Community Noise Environments, 1975

Aircraft Noise

The development of CNEL aircraft contours for Alameda was a complex undertaking involving a variety of methodologies. The conclusions are illustrated on the accompanying maps.

The M.A.G. contours represent the current CNEL generated by Oakland Airport, Alameda Naval Air Station and San Francisco International Airport. The contours were determined by the following means:

- Naval Air Station contours were calculated in the "Aircraft Noise Study for the Naval Air Station, Alameda," prepared by Robin M. Towne and Associates, as amended July 22, 1975.
- Oakland contours were determined by adjusting contours generated by Bolt, Baranek and Newman for the Port of Oakland for 1973-1974 to match the monitoring figures obtained by the Port of Oakland at their sites 1 and 2 between March, 1974 and December, 1975. This "displacement" was compared with monitoring done by the Port on Mecartney and Belmont in 1974 and at the four monitoring points used for the February, 1973 monitoring done by BB&N for Harbor Bay Isle.
- San Francisco contours were calculated from SENELs taken from the 1973 monitoring and flight schedules.

Although the Bolt, Baranek and Newman (BB&N) contour pattern for Oakland Airport was assumed to be reasonably accurate, the numerical value of the contours was not relied on. The BB&N 80 dB CNEL contour passed near the Port of Oakland monitoring station number one where the monitored CNEL value for 1975 was 75.23 dB. M.A.G. concluded that the BB&N contours were approximately 5 dB too high.

The M.A.G. Oakland Airport contours also are based on the assumptions that: all jets and large aircraft depart from Runway 29 and land on Runway 11 (depending on wind conditions); all small propeller aircraft depart from Runway 27 and made a right turn in westflow and land on Runway 09 after a left turn in eastflow.

The following table shows the results of quarterly monitoring of Oakland Airport at two fixed locations. It is encouraging to note the steady trend toward lower noise levels.

Quarterly Returns of Oakland Airport CNELs*

| <u>Period</u> | <u>Average CNEL (dB)</u> | |
|-------------------|--------------------------|-------------------|
| | <u>Location 1</u> | <u>Location 2</u> |
| 3/21/73-9/21/73 | 79.08 | 75.81 |
| 3/21/73-12/21/73 | 78.23 | 75.23 |
| 3/21/73-3/20/74 | 78.13 | 74.74 |
| 6/22/73-6/21/74 | 77.58 | 74.30 |
| 9/22/73-9/21/74 | 76.51 | 73.27 |
| 12/22/73-12/21/74 | 76.76 | 72.87 |
| 3/22/74-3/21/75 | 76.17 | 72.76 |
| 6/22/74-6/21/75 | 75.94 | 72.58 |
| 9/22/74-9/21/75 | 75.65 | 72.55 |
| 12/22/74-12/21/75 | 75.23 | 72.65 |

* Port of Oakland noise monitoring data. Locations 1 and 2 are shown on Aircraft Noise Exposure Levels Map.

The M.A.G. aircraft noise contour map shows that the northwest and southeast portions of the City are significantly effected by aircraft noise. The area generally north of Atlantic Avenue is subject to CNEL ranging from 60 dB to 70 dB. This area includes noise sensitive uses such as the College of Alameda, Woods School and residences housing about 11,300 persons, including residents of the Naval Air Station.

Nearly all of Bay Farm Island is shown within the 60 dB to 70 dB CNEL range. The developed portion of the Island is bracketed by the 60 dB and 65 dB M.A.G. contours.

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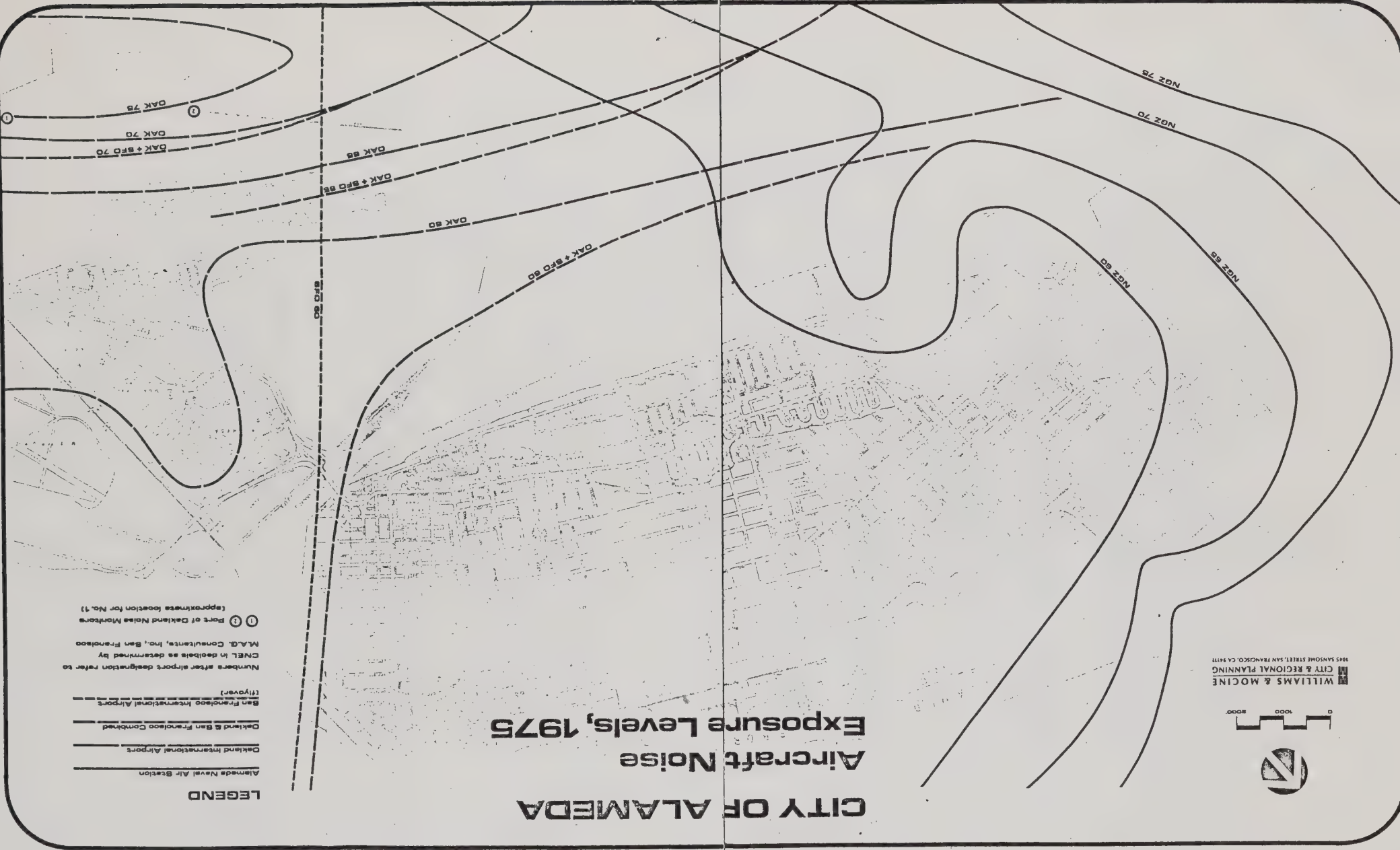


CITY OF ALAMEDA Aircraft Noise Exposure Levels, 1975

LEGEND

- Alameda Naval Air Station
- Oakland International Airport
- Oakland & San Francisco Combined
- San Francisco International Airport
- (flyover)

Numbers after airport designation refer to
CNEL in decibels as determined by
M.A.G. Consultants, Inc., San Francisco
① ② Port of Oakland Noise Monitoring
Approximate location for No. 1)



A research report by Wyle Research, dated April, 1976, developed CNEL contours for Oakland Airport. The report, prepared for the City of Alameda, was primarily oriented to calculating the relationship between noise contours and operational data. The Wyle study generated CNEL values at fixed points and plotted contours using a computer program utilizing four types of input data:

- Geometry of airport runways and ground traffic
- Detailed aircraft traffic statistics
- Aircraft performance (takeoff and landing profiles)
- Aircraft noise data

Wyle Research computed contours for the period between October, 1974 and September 1975 using three different sets of assumptions (cases). The results are shown on the accompanying maps labelled Case A, B and C. Case A represents noise levels generated by all traffic, including SFO overflights. Case B excluded SFO overflights. Those overflights had only a slight effect on the contours. Case C was based on Oakland Airport traffic only, without training flights, without SFO overflights and with all traffic assigned to runways 27L and 27R in cases A and B moved to runways 29-11.

Two sources of aircraft noise are not included in the contours. Fifteen percent of the commercial westflow departures from Oakland Airport make a right turn near the Naval Air Station. This amounts to seven or eight daytime departures. The CNEL contour produced does not reach 60 dB in Alameda.

During southerly storm conditions SFO arrivals pass over central Alameda. Although this activity is fairly noisy it occurs so infrequently on a yearly basis that it was not useful to attempt to calculate a CNEL curve for that flight track.

The relationship of activities on runway 27 to noise levels is of particular interest. A comparison of Case B and Case C indicates the benefits derived from routing executive and heavy aircraft to runway 29. A similar comparison is shown on page 41 (7.5 million case). The difference in terms of noise energy at

point 5 of the matrix is shown on the accompanying chart (Wyle R. 4-2). Using either Case A or Case B for the baseline the results of moving this traffic to runway 27, shown by Case C and the rest of the matrix, is dramatic.

Case C represents the appropriate contours for implementation of the Noise Element. The Board of Port Commissioners by resolution has recently indicated that executive and heavy aircraft will be moved from runway 27 to runway 29, training flights are decreasing as fuel costs rise and SFO noise levels are decreasing and expected to have no impact on Bay Farm Island in the future.

Wyle contours are used for Oakland airport for the Community Noise Environment Map (p. 91). They are higher than M.A.G. contours and therefore insure a quieter environment. They were also generated by computer analysis, the method suggested by the state guidelines (which were adopted after M.A.G. was retained to do contours). The Wyle program used measured noise data for specific aircraft types and the complete fleet mix for one year while the M.A.G. contours adjusted previously computed contours to monitoring points. It is not known whether the M.A.G. approach enjoys a higher or lower level of confidence than the more standard approach used by Wyle. Therefore, the suggestion of the guidelines has been followed. The M.A.G. contours (p.20) show Alameda Naval Air Station and San Francisco/Oakland contours for the main island and provide an example of the complexity inherent in CNEL measurements. It is apparent from a comparison of the M.A.G. and Wyle contours that differences in assumptions or methodology can produce significantly different results.

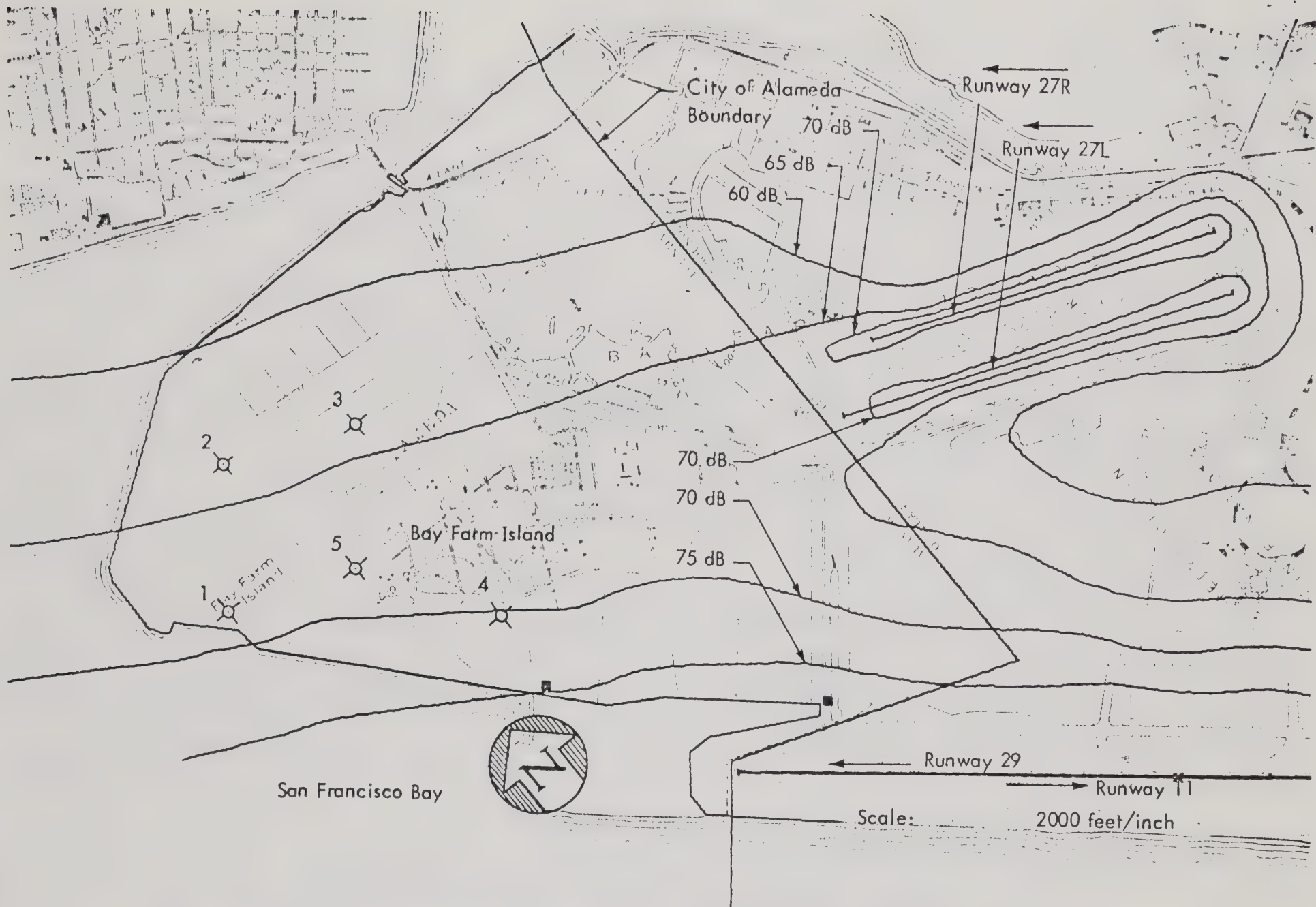


Figure 4-1. 1975 CNEL Contours Over Bay Farm Island for Case A: Aircraft Traffic on OAK Runways 29, 11, 27L and 27R, and Overflights by Aircraft Departing from SFO. Also Shown are 5 Points Where CNEL Values Were Computed Separately (X) and the two Port of Oakland Noise Monitoring Stations (■).

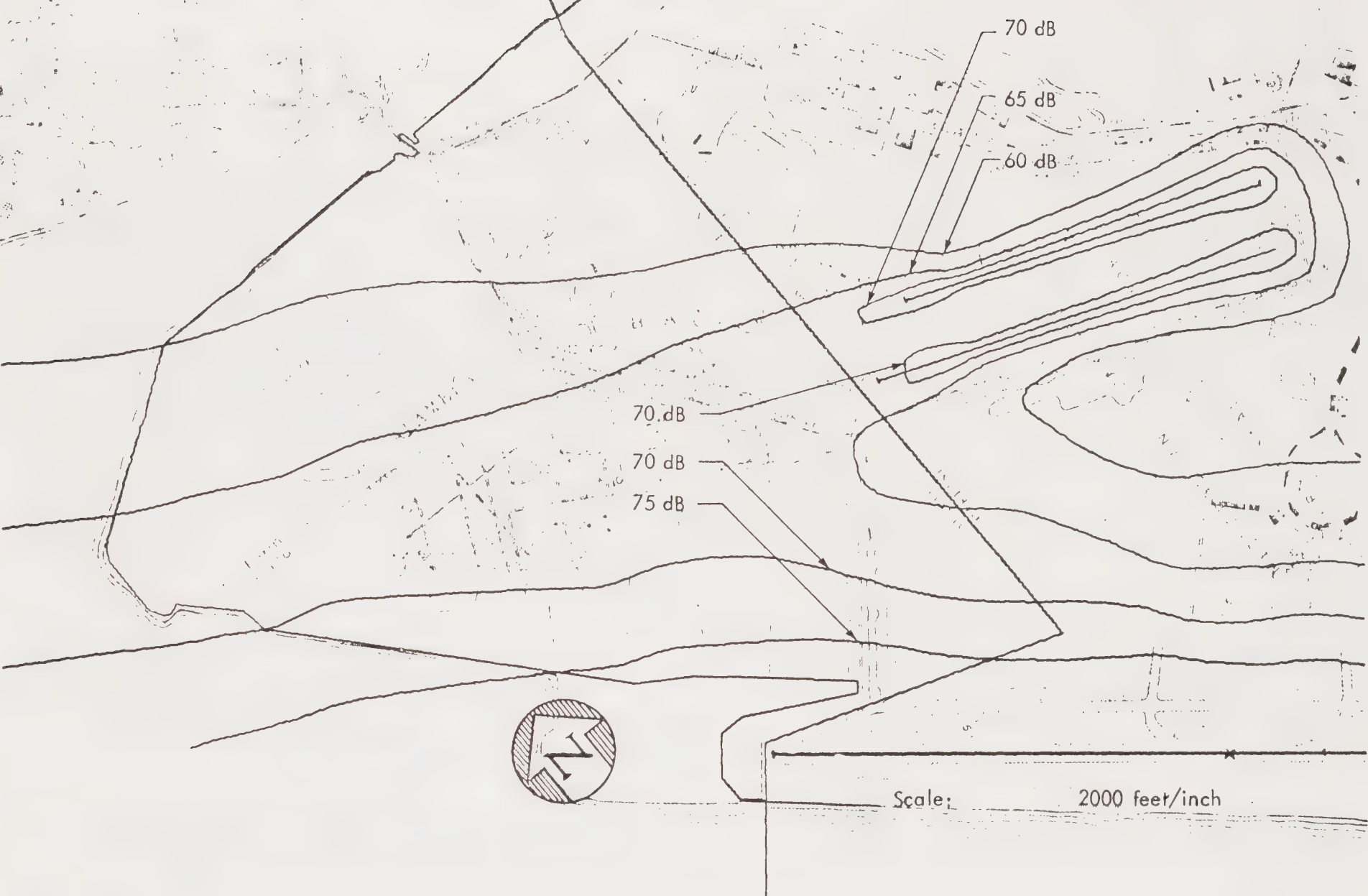


Figure 4-2. 1975 CNEL Contours Over Bay Farm Island for Case B: Aircraft Traffic on OAK Runways 29, 11, 27L and 27R. No Overflights Due to SFO Operations. See Figure 4-1 for More Detailed Annotations.

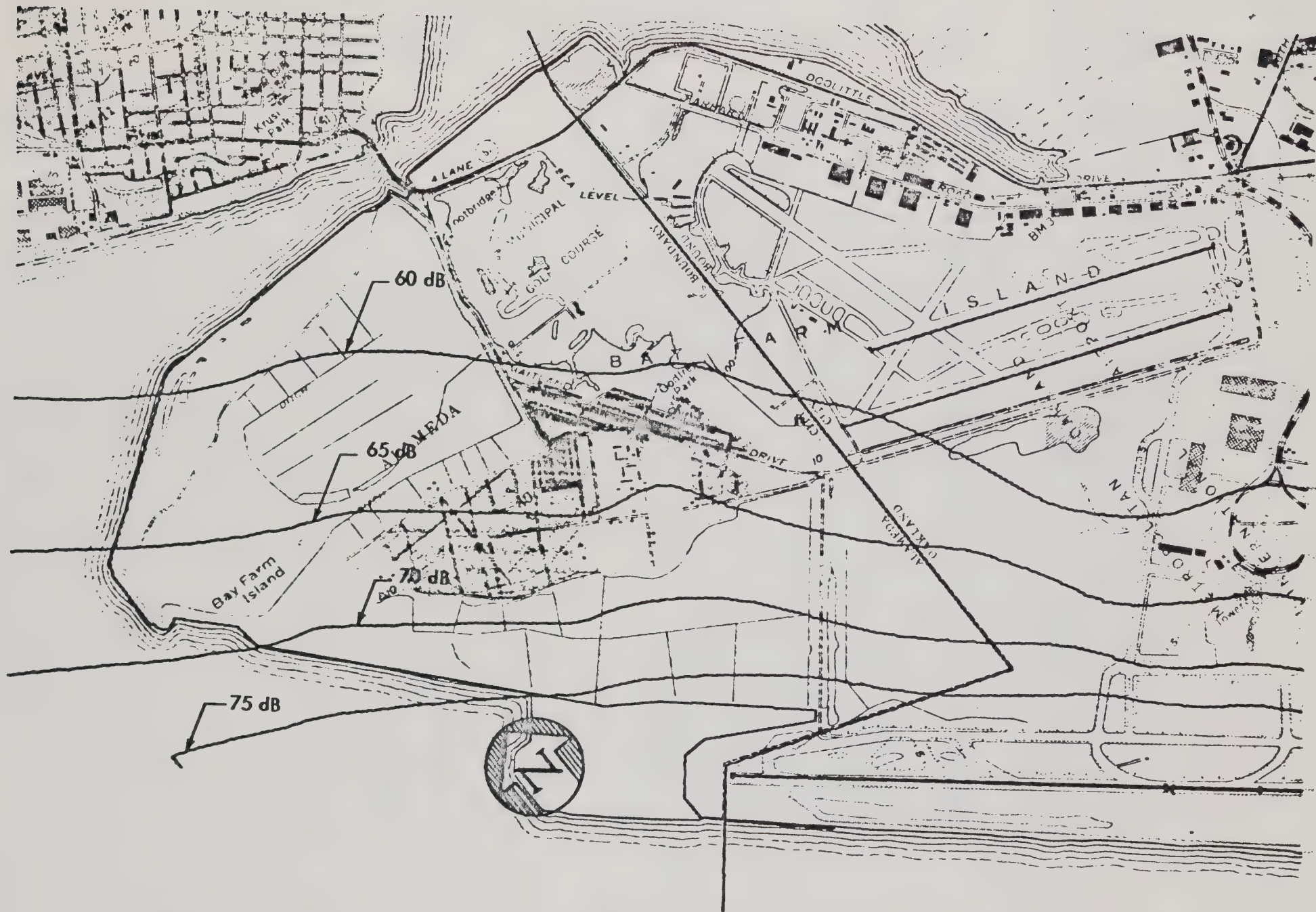


Figure 4-3. 1975 Hypothetical CNEL Contours Over Bay Farm Island for Case C: Aircraft Traffic on OAK Runways 29 and 11; Traffic on 27L and 27R Moved to 29-11. No Training Flights, no Over-flights Due to SFO Operations. See Figure 4-1 for More Detailed Annotations.

Noise Sensitive Uses

Noise monitoring was undertaken to determine the exposure levels at selected sites in Alameda. The following table lists noise sensitive uses within the City and the sound levels registered during the monitoring period. The L_{eq} values presented below are approximately equal to the CNEL values for the listed sites.

| <u>Facility</u> | <u>Equivalent Energy Level</u> | <u>Date</u> |
|--|--------------------------------|-------------|
| St. Philip Neri School | 70.4 dB | 1/29/75 |
| Washington School | 70.2 dB | 1/22/75 |
| Paden School | 69.4 dB | 1/21/75 |
| Haight School | 68.9 dB | 1/22/75 |
| Mastic School | 68.9 dB | 11/19/74 |
| Longfellow School | 65.5 dB | 1/21/75 |
| Chipman School | 64.1 dB | 1/29/75 |
| Encinal High School | 63.9 dB | 11/16/74 |
| Notre Dame School | 60.7 dB | 11/19/74 |
| Woodstock School | 59.2 dB | 1/24/75 |
| Franklin School | 56.0 dB | 1/24/75 |
| Edison School | 54.6 dB | 1/29/75 |
| Island High School | 48.9 dB | 1/29/75 |
| Senior Citizens' Home (Park near Otis) | 71.2 dB | 1/29/75 |
| City Library | 70.3 dB | 1/29/75 |
| Marina Sanitorium | 64.7 dB | 1/27/75 |
| Rest Home (Park and Blanding) | 64.5 dB | 1/24/75 |
| Alameda Hospital | 60.4 dB | 1/27/75 |

Source: Noise Monitoring by M.A.G. Consultants

NOISE EXPOSURE INVENTORY

A series of overlays was utilized to determine the impact of noise upon the population of Alameda. Using data provided by the City Planning Department, the 1975 population distribution was mapped and related to surface and aircraft noise contours. Since the data was generalized and the contours are, in some cases, approximate, the conclusions must be accepted as only an estimate. The conclusions are shown by neighborhood on the accompanying chart.*

The chart shows that one half of the population resides below and one half above the 60 dB CNEL contour. In other words, fifty percent of the population lives in a relatively quiet environment. Among the quietest neighborhoods are: South Shore, Ballena Bay and South Central. It is interesting that in the 1974 Goals Study Ballena Bay was one of the areas most concerned with noise. It is also interesting but understandable that, in terms of numbers of people affected, the Naval Air Station is the noisiest area in the City but, in the Goals Study, respondents from that area expressed little concern with noise.

* For neighborhood boundaries see the map on page 13.

1975 ALAMEDA POPULATION SUBJECT TO VARIOUS CNEL (ESTIMATED)

| | | C N E L in D E C I B E L S | | | | | | | |
|-----------------|--------|----------------------------|------|--------|------|--------|------|---------|------|
| Neighborhood | Pop. | Up to 60 | | 60-65 | | 65-70 | | Over 70 | |
| | | Pop. | %* | Pop. | % | Pop. | % | Pop. | % |
| West End | 8,000 | 4,000 | 50.0 | 3,000 | 37.5 | 800 | 10.0 | 200 | 2.5 |
| Ballena Bay | 1,600 | 1,200 | 75.0 | 400 | 25.0 | - | - | - | - |
| South Shore | 8,000 | 6,400 | 80.0 | 1,300 | 16.3 | 300 | 3.7 | - | - |
| South Central | 17,000 | 13,000 | 76.5 | 3,400 | 20.0 | 600 | 3.5 | - | - |
| North Central | 9,500 | 3,000 | 31.6 | 5,300 | 55.8 | 700 | 7.4 | 500 | 5.2 |
| East End | 15,000 | 9,800 | 65.3 | 3,100 | 20.7 | 1,000 | 6.7 | 1,100 | 7.3 |
| Bay Farm Island | 5,200 | - | - | 3,000 | 57.7 | 2,200 | 42.3 | - | - |
| Naval Air Stat. | 11,000 | - | - | 2,000 | 18.2 | 7,000 | 63.6 | 2,000 | 18.2 |
| TOTAL | 75,300 | 37,400 | 49.7 | 21,500 | 28.6 | 12,600 | 16.7 | 3,800 | 5.0 |

* Percent of neighborhood population.

FUTURE NOISE

SURFACE NOISE

Several assumptions are employed to estimate the future noise levels generated by autos, trucks and buses. By 1985, it is assumed, autos will expend one-half the amount of energy expended in 1975. This reduction will decrease noise levels from this source by 3 dB. Trucks and buses will employ regenerative use of exhaust-gas energy, thereby reducing noise emission by 6 dB. This 6 dB reduction takes into account the current legislative requirement for a 5 dB reduction in individual maximum truck noise levels, a 3 dB reduction attributable to a better fuel utilization and a 3 dB increase attributable to a doubling of bus and truck traffic volume.

By 1995, it is assumed that autos will expend one-fourth the amount of energy expended in 1975. This will cause a 6 dB reduction of 1975 noise levels from that source. Assuming the use of turbine engines in trucks and buses, individual noise will decrease an additional 3 dB but this reduction will be counter-balanced by a doubling of traffic over 1985.

The sum of the above assumptions of future auto, truck and bus-generated noise would result in surface traffic noise levels in 1985 of 5 dB less than 1975 and 7 dB less than 1975 by 1995.

In a report prepared for the Environmental Protection Agency in 1971, Wyle Labs. projected a decrease of 3 dB for passenger cars, mainly due to the Motor Vehicle Standards section of the California Vehicle Code; and projected truck noise to decrease from 4 to 7 dB. Local effort will be required to enforce the Vehicle Code; particular attention would have to be given to motorcycles and other vehicles which are easily altered to produce a higher level of noise than is permitted by the Code.

Other surface noise, such as that generated by industrial activity, also is expected to decrease. Although the degree has not been estimated, community action, such as that indicated under "Mitigating Measures for Noise Control," herein, should accomplish a general reduction of noise from these sources.

Although the long term trend is for a general reduction in vehicular noise levels, there remains the problem of calculating noise levels generated by vehicles on streets to be constructed in the near future in vacant areas, such as Bay Farm Island. Contours for such new streets, once they are designed, may be calculated by applying the methodology outlined in "Estimation of Community Noise Exposure in Terms of Day-Night Average Level Noise Contours," prepared by Jack W. Swing of the State Office of Noise Control. The publication was revised in May, 1975.

In a report dated January, 1976, Alan M. Voorhees & Associates estimated the traffic impacts of the developer's proposed plan for Harbor Bay Isle development. The report contained 1973 traffic volumes for streets that would be effected by the development and estimated 1983 traffic volumes for those streets with and without Harbor Bay Isle development. The table on the following page shows how the CNEL from those streets would be effected. Although the development would increase the CNEL in each case, the 1983 noise levels generally are lower than in 1975 due to the overall anticipated reduction of vehicular noise, as previously discussed.

RAILROAD NOISE

Federal legislation is requiring substantial reductions in noise emission of locomotives. On-board shielding and other design improvements also are anticipated. By 1985 the overall effect should reduce noise levels from this source by 10 dB at current volumes and by 7 dB with volumes as much as twice current volumes.

By 1995 it is likely that extreme technological changes in the industry will result in noise reduction as great as 20 dB below 1975 levels. Even with volumes as great as ten times those of 1975, noise levels would be reduced at least 10 dB from 1975 levels.

Ground-Noise CNEL on streets which, according to "Harbor Bay Isle Traffic Impacts, Alan M. Voorhees & Associates, Inc., January 1976, are presumed to be impacted by traffic to and from Harbor Bay Isle (assuming all additional vehicles to be powered by internal-combustion engines).

| <u>Street Segment</u> | <u>CNEL - 1975 dB</u> | <u>CNEL - 1983 Without HBI dB</u> | <u>CNEL - 1983 With HBI dB</u> |
|---|---------------------------|---|--|
| Bay Farm Island Bridge | 69 | 66.2 | 67.7 |
| High Street Bridge | 69 | 65.0 | 65.3 |
| Fruitvale Bridge | 68 | 64.9 | 65.9 |
| Park Street Bridge | 72 | 68.0 | 68.2 |
| Island Drive, HBI-Doolittle | 67 | 62.6 | 67.0 |
| Doolittle Drive, Island Dr. - City Line | 64 | 64.5 | 66.6 |
| Doolittle Drive, City Line - Hegenberger | 64 | 65.1 | 67.6 |
| City Line Drive, HBI-Doolittle | - | 60.2 | 62.7 |
| Otis Drive, Peach - High | 70 | 65.8 | 67.4 |
| Otis Drive, High - Broadway | 69 | 66.3 | 67.5 |
| Otis Drive, Broadway - Park | 70 | 65.3 | 65.8 |
| Otis Drive, west of Park | 69 | 65.0 | 65.1 |
| High Street, north of Fernside | 69 | 65.0 | 65.3 |
| High Street, Otis - Fernside | 65 | 63.3 | 63.9 |
| Encinal, Fernside - Broadway | 60 | 57.6 | 57.6 |
| Encinal, Broadway - Park | 67 | 63.1 | 63.2 |
| Broadway, Otis - Tilden | 66 | 62.7 | 64.5 |
| Park Street, north of Otis | 67 | 66.6 | 66.9 |

AIRCRAFT NOISE

It appears generally that the trend is toward decreased aircraft noise. The extent of the decrease, however, depends upon a complex variety of circumstances. Some authorities feel physical, economic and legal constraints will contribute to reduced air traffic; others feel that aircraft operations will continue to increase for an indefinite period.

An EPA report "National Measure of Aircraft Noise Impact Through the Year 2000" was discussed with Louis Sutherland of Wyle Labs, one of its authors. The report seeks to determine, under varying strategies for noise reduction, the number of people who would be subjected to Ldn levels of 65 dB. Ultimately noise reduction is indicated. Some of the strategies indicate temporary increases in the mid 1980s. Mr. Sutherland indicates that the report has been updated and the new report indicates that even if no further steps were taken to reduce noise, attrition in the fleet would still reduce the numbers of people exposed to an Ldn of 65 dB significantly (7.1 million in 1972 to 5.1 million in 1987). The use of SAM retrofit, etc. would increase the reduction another 50 percent (2.6 million in 1987).

Numerous estimates and assumptions have been made regarding the future level of activity at Bay Area airports. Two consulting firms were asked to analyze the future noise potential at Oakland Airport. SFO provided the City with future contours (pp. 37-39) and the Naval Air Station reports that although levels cannot be stated reductions are expected.

M.A.G. Estimate

M.A.G. Consultants, Inc. have evaluated such factors as technological and operational improvements, fuel depletion and regulatory influences to arrive at the following estimated reductions in aircraft noise effecting Alameda:

| <u>Airport</u> | <u>CNEL in 1985</u> | <u>CNEL in 1995</u> |
|----------------|----------------------|----------------------|
| San Francisco | 8 db less than 1975 | 12 db less than 1975 |
| Oakland | 11 db less than 1975 | 15 db less than 1975 |
| Alameda N.A.S. | 2 db less than 1975 | 2 db less than 1975 |

SFO Report

CNEL contour projections were prepared for San Francisco International Airport by Wyle Laboratories for 1976, 1981 and 1986. The projections, reproduced on the following pages, show the decreasing influence on Alameda of SFO generated noise.

Wyle Report

The Wyle Report uses a matrix approach to analyze the relationship of increased passenger growth vis-a-vis improved hardware (quieter engines) on noise. Passenger projections alone are a poor indicator because aircraft operations generated¹ from passenger volume depend on plane load factors (number of seats filled). In turn, the noise generated (CNEL) by operations is a function of the type of engines used in the operations and the time of day that they occur (assuming other factors constant). Passenger projections and Oakland's growth rates have been unstable in recent years. A definitive approach to future noise, i.e., drafting specific contours, was considered unreliable and unproductive. The approach used was to explore the parameters of future noise. Arnold Thompson Associates developed a matrix using various existing passenger projections² for the next twenty years as one axis and different engine (hardware) configurations for the other axis. A fleet mix was estimated, from information in Thompson's files, for the time frames involved using a conservative (worst case) approach for the time that quieter aircraft would enter the fleet. No fuel constraints were assumed although higher fuel prices were expected to increase plane load factors somewhat. From the data in its files Wyle generated the CNEL levels for the hypothetical cases in the matrix for, in all but the most improbable cases,³ five points on Bay Farm Island (p. 39a). The 65 dB contours for some

¹ A doubling of operations (given similar conditions) increases CNEL by about 3 dB.

² Federal Aviation Administration and Air Transport Association projections and ABAG-MTC allocations. This report may be found in the Wyle report.

³ Improbable cases are indicated by an X.

of the more plausible cases were generated also (pp. 40-42). The results,¹ comprehensively viewed, are consistent with the EPA studies already discussed. Considerable increases in growth may occur without appreciable increases in noise where the fleet does not remain unchanged. If very large increases in passenger volume occur in the time frame substantial increases in noise may occur unless a different kind of hardware is introduced.² Although noise curves were not available for Revised FAR 36 cases in the matrix and therefore those cases could not be set up for the computer, Wyle estimates reductions in those cases in the area of 5 dB. Ultimately, noise should decrease when a newer type of aircraft comes into service.

Title 4

Any discussion on future aircraft noise must take into consideration 4 Cal. Adm. Code Section 5000 et. seq. These are the regulations promulgated under the State Aeronautics Act which govern airport noise matters. The strategy employed by the regulations is to define noise sensitive areas in terms of land use and set out a criteria which airport operators must meet by certain dates. Although temporary variances are provided for and limited exceptions can be employed, the basic thrust of the regulations is to require airport operators to run their airports in such a fashion that the Annual Community Noise Equivalent Level measurement does not exceed 75 dB today, 70 dB by 1981, and 65 dB by 1986 in residential areas of the type existing today on Bay Farm Island. One might conclude from the foregoing discussion that the future noise level is established

1 The matrix should be compared to Case C of the Wyle Contours. The matrix included training flights for all but the 13 and 15 millions cases and Case C did not. Therefore, some of the increases in the matrix points over Case C are due to that difference. However, the impact of training flights on the matrix is very small.

2 One factor identified by the study is that retrofitting hardware for engines is relatively ineffective for take-off oriented areas like Bay Farm Island.

at 65 dB at about Catalina Avenue, the closest residential area to Oakland International's jet runway. However, that conclusion is indefinite. First, the Single Event Noise Exposure Level regulation contained in the same part of Title 4 has been ruled invalid because of federal preemption. Finally, total noise is considered in land use decisions, rather than one source of noise.

The Noise Element assumes that the regulations are valid and that if preempted it is reasonable to expect the federal government to take further steps to control noise, as it is already doing with aircraft engine regulations.

The State Guidelines discourage residential use in areas subject to a CNEL of 65 dB or greater where the source of noise is primarily from airports. Insofar as Title 4 places a duty on the airport operator to keep noise down to 65 dB in residential areas some practical conflict would exist were residential use not discouraged in those areas.

The Noise Element avoids the conflict in two ways. First, the Community Noise Environment Map places the line between acceptable and non-acceptable uses on Catalina Avenue.¹ The only certain method by which the airport can comply with Title 4 is to reduce noise above Catalina Avenue to 65 dB or less.² Finally, airport generated noise is treated separately (p.88) under the policies for compatible land use (pp.84-90). In effect, two different lines between acceptable and non-acceptable uses are drawn for aircraft noise. The intent of the Noise Element is to create a flexible line for new construction (the 65 dB line) which can be adjusted as the noise environment changes and a less flexible line (along Catalina Avenue) which should not be adjusted until it is reasonably certain that no temporary increases in aircraft noise will arise in the future.³

-
- 1 The 70 dB contour (Case C) actually falls somewhere below Catalina Avenue. However, that location would leave a strip of land cut off, in terms of use, from the rest of the vacant land in the area and "encroaches" further on Runway 29.
 - 2 Variances under Title 4 are temporary and it is extremely unlikely that all of the residents near Catalina Avenue would consent to the airport sound-proofing their homes.
 - 3 Although it has no bearing on Title 4 where aircraft is the source of noise (p.88), the possibility of temporary increases is addressed by assuming a 5 dB increase in the base line measurement for sound attenuation purposes under Ordinance No. 1750.

Conclusion

Based on the M.A.G. estimates, Title 4 requirements, SFO studies, the Wyle Report and EPA studies it appears reasonably certain that future aircraft noise levels will be reduced in Alameda anywhere from 2 to 15 decibels by 1995. It seems reasonable to expect a 5 dB reduction for the Oakland Airport. The time required for these reductions is uncertain and the possibility of temporary increases cannot be ruled out.¹ Present levels and annually measured reductions, if experienced, should serve as adequate land use criteria.² Some cushion for temporary increases should be provided through construction techniques (p. 78).

1 More recent growth rates for California population as a whole and Oakland Airport passenger volume in particular do not indicate a high probability that this will occur.

2 See p. 83 et. seq.

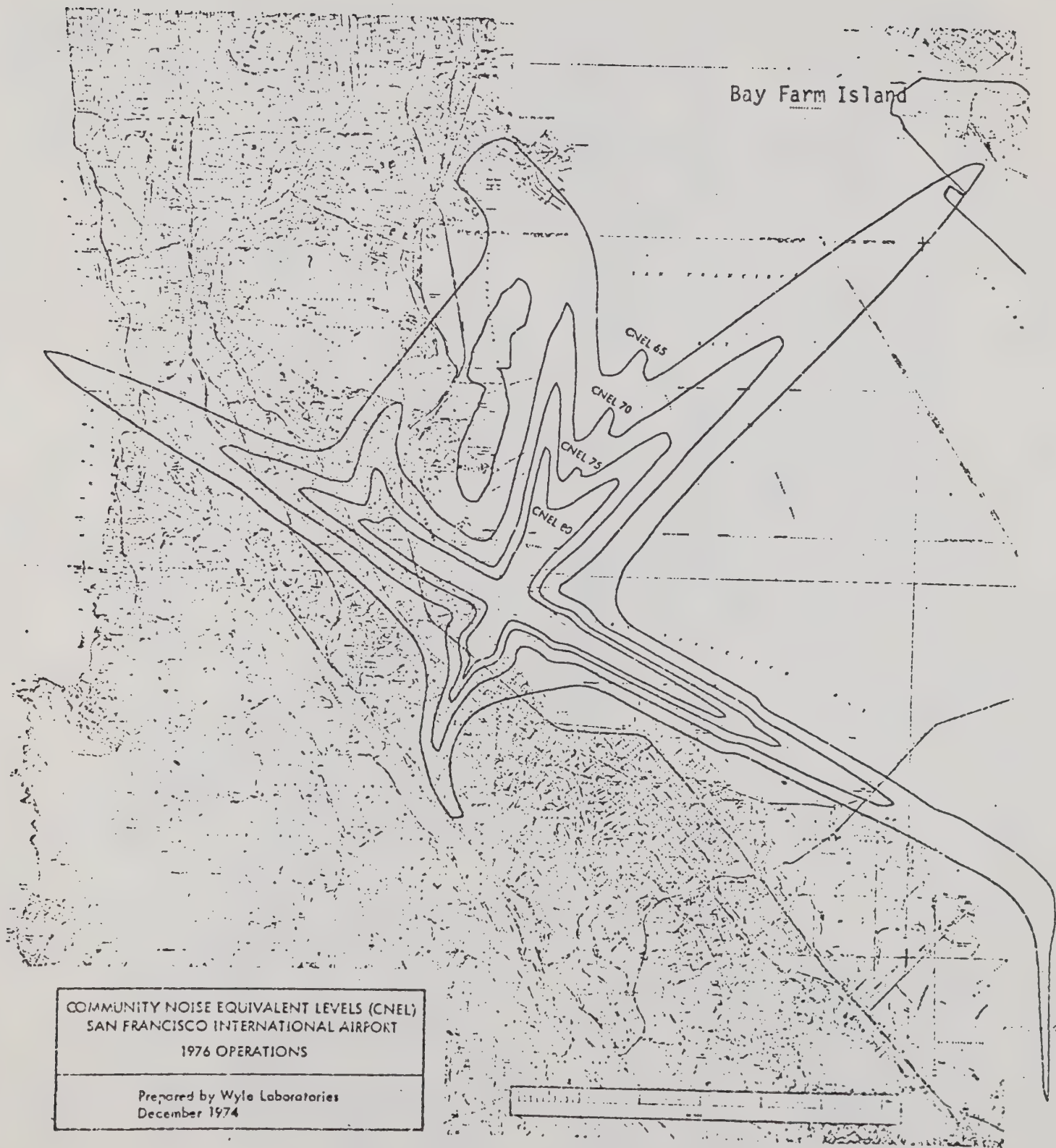


Figure 1. -CNEL Coniour Projections - 1976

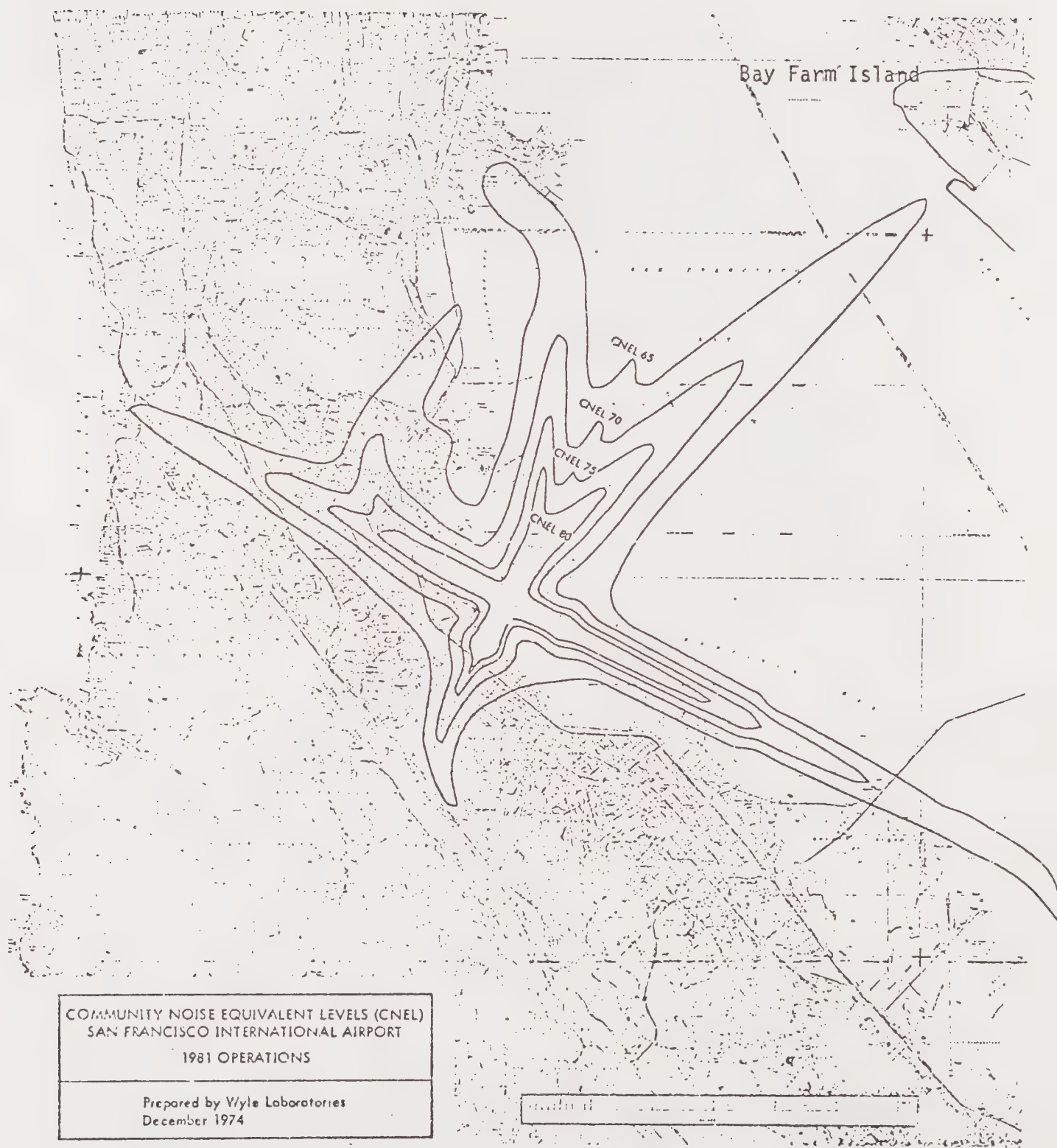


Figure 2. CNEL Contour Projections - 1981

Table 4-1

CNEL in dB at Five Fixed Points for Various Cases

Left Portion: Present; Right Portion: Future

See Figure 4-1 for Location of Points, and Lower Left Corner of this Table for Key

| October 1974 - September 1975 | | | Technical Assumptions | Future - Millions Annual Passengers | | | | | | | | | |
|-------------------------------|------|---|-----------------------|-------------------------------------|------|-------|------|---------|------|--------|------|--------|------|
| 2.09 MAP | | | | 3.5 MAP | | 5 MAP | | 7.5 MAP | | 13 MAP | | 15 MAP | |
| 63.5 | 63.7 | Case A All Traffic | Existing Fleet | 61.9 | 62.1 | 62.2 | 62.3 | 63.5 | 63.7 | | | | |
| 68.2 | | | | 67.1 | | 67.5 | | 68.8 | | | | | |
| 68.6 | 70.2 | | | 67.6 | 69.8 | 67.9 | 70.1 | 69.3 | 71.3 | | | | |
| 63.2 | 63.2 | Case B No SFO Overflights | JT8D Retrofit | 61.0 | 61.5 | 61.5 | 62.0 | 62.5 | 63.0 | | | | |
| 68.0 | | | | 66.8 | | 67.2 | | 68.2 | | | | | |
| 68.5 | 70.0 | | | 66.7 | 69.4 | 67.3 | 69.9 | 68.3 | 70.8 | | | | |
| 62.2 | 62.0 | Case C No SFO, No Training, RW 27 Traffic Moved to RW 29-11 | Total Retrofit | 60.5 | 61.2 | 61.1 | 61.7 | 62.2 | 62.8 | 64.1 | 65.0 | 64.4 | 65.0 |
| 67.1 | | | | 66.4 | | 66.9 | | 68.1 | | 70.2 | | 70.3 | |
| 68.0 | 69.6 | | | 66.2 | 69.0 | 66.8 | 69.5 | 68.0 | 70.6 | 69.9 | 72.8 | 70.2 | 72.9 |
| 2 | 3 | Key To Points | Revised FAR 36 | | | | | | | | | | |
| 5 | | | | | | | | | | | | | |
| 1 | 4 | | | | | | | | | | | | |

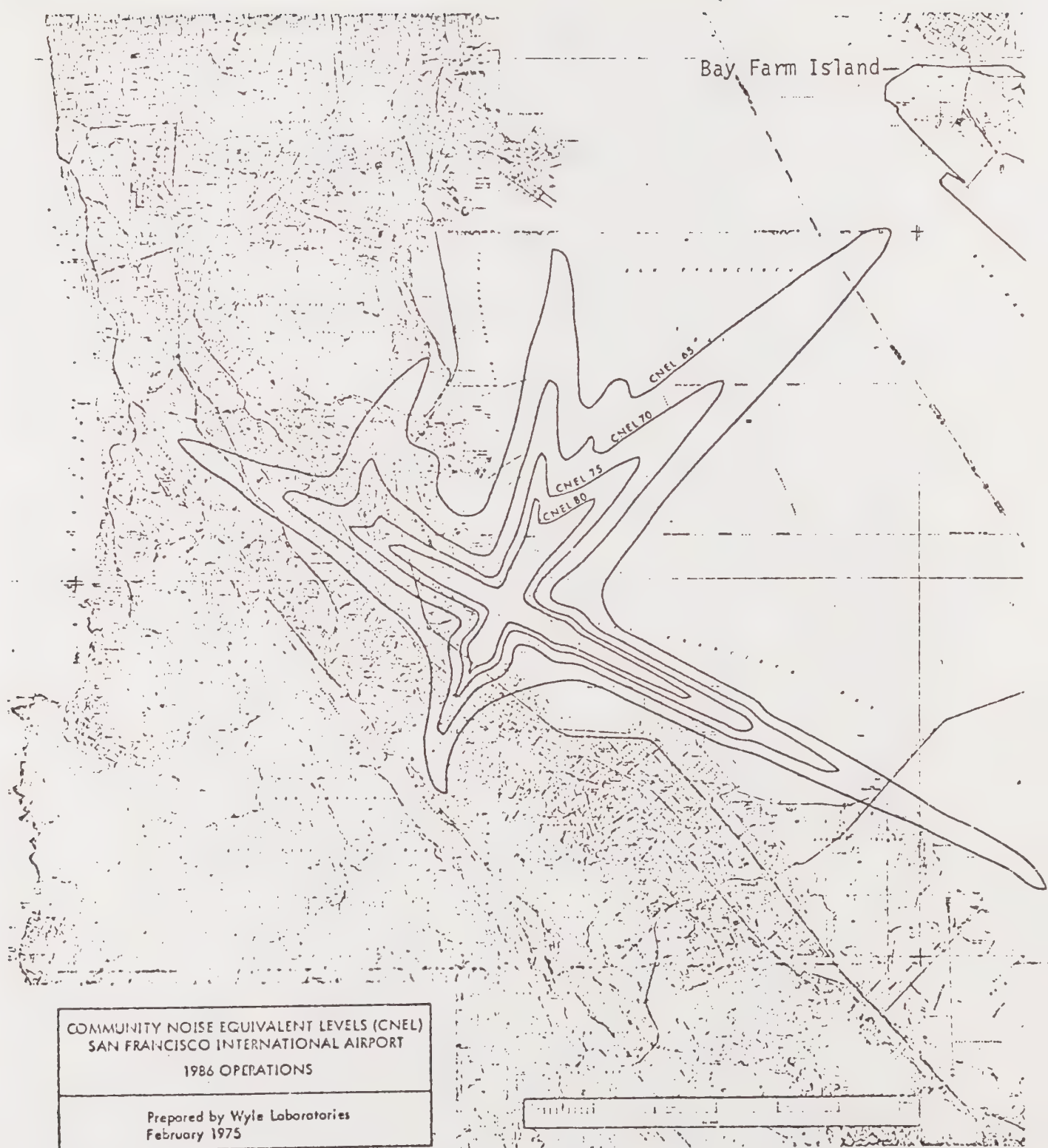


Figure 3. CNEL Contour Projections - 1986

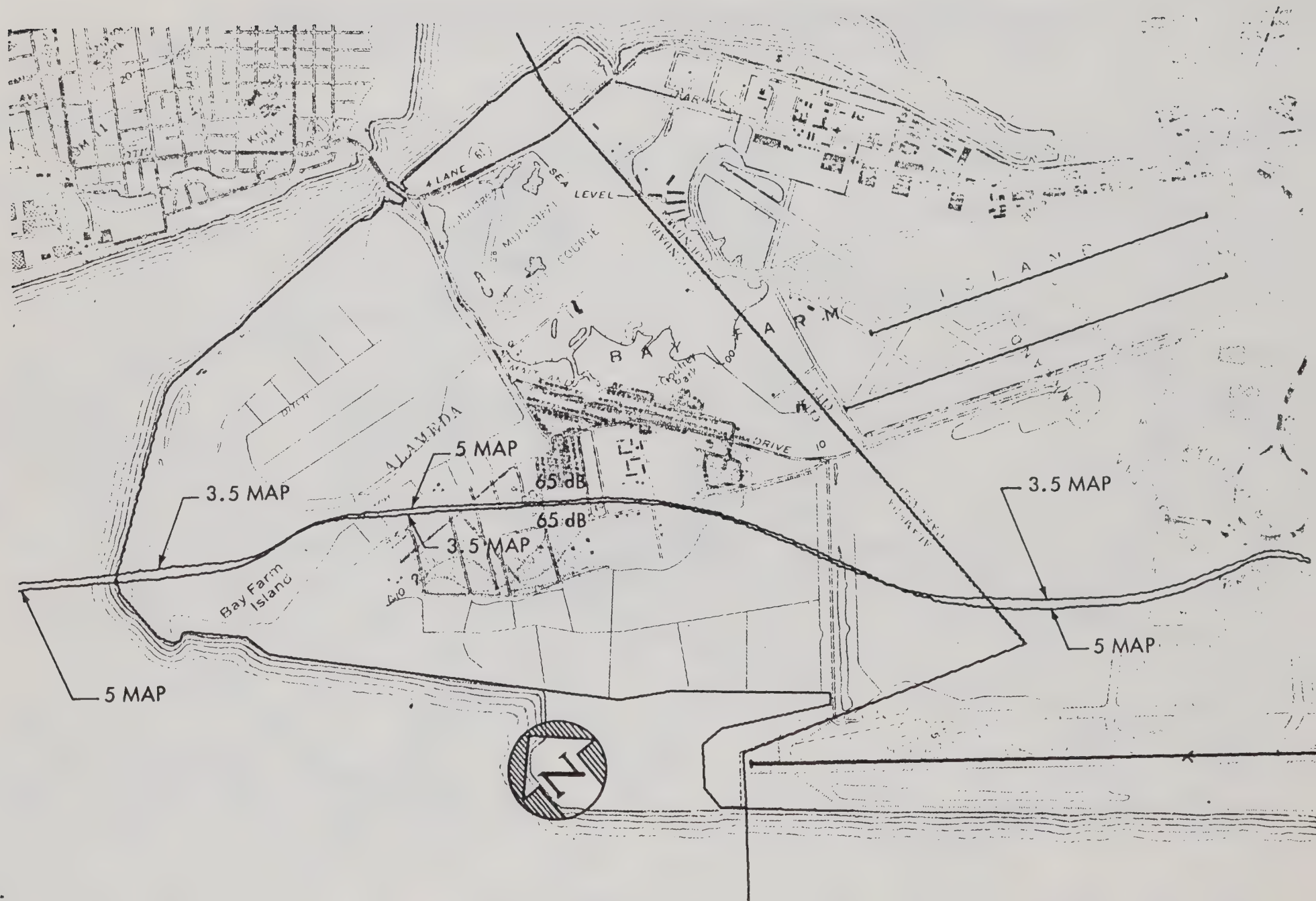


Figure 4-4. CNEL Contours Over Bay Farm Island for Two Future Cases: 3.5 MAP, Existing Fleet; 5 MAP, JT8D Retrofit. See Figure 4-1 for More Detailed Annotations.

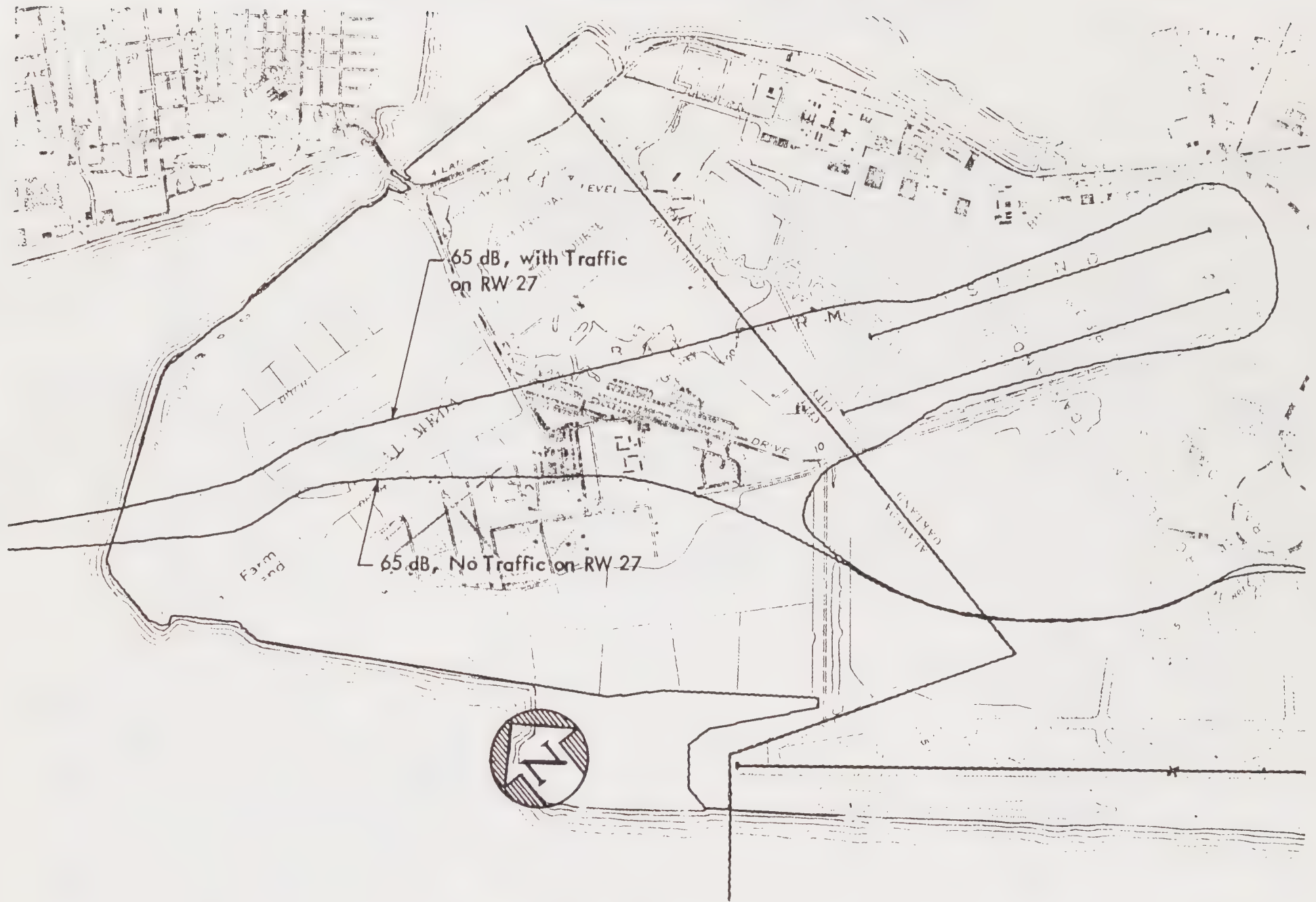


Figure 4-5. CNEL Contours Over Bay Farm Island for the Future Case of 7.5 MAP, Total Retrofit, with and without Business Jet Traffic on the North Field Runways. See Figure 4-1 for More Detailed Annotations.

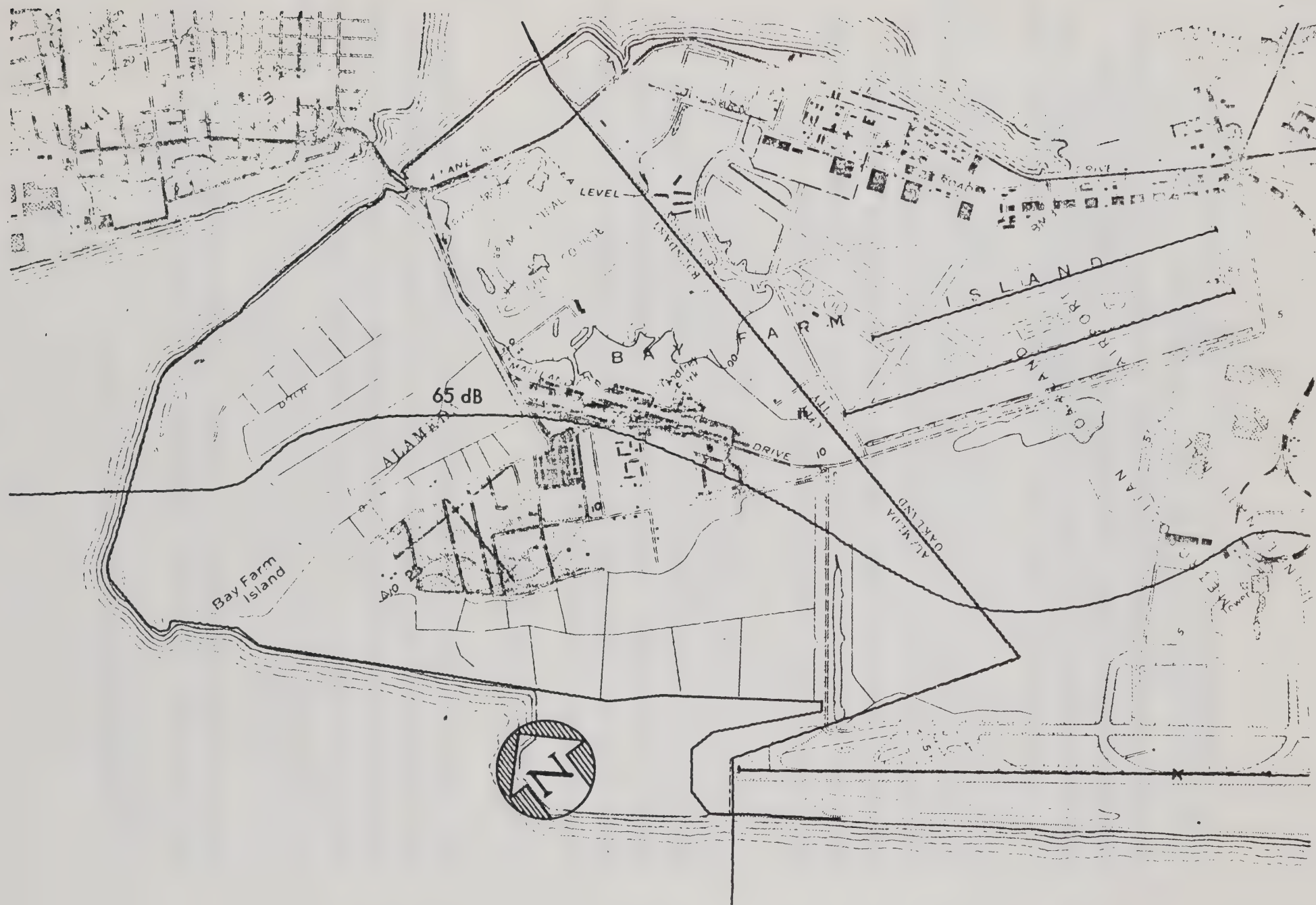


Figure 4-6. CNEL Contours Over Bay Farm Island for the Future Case of 13 MAP, Total Retrofit.
See Figure 4-1 for More Detailed Annotations.

FUTURE POPULATION

The 1970 U.S. Census counted 70,968 persons in Alameda. By 1975, an estimated increase to 76,500 occurred. The 1968 Comprehensive General Plan, November, 1968, indicated the probable 1990 Alameda population would be 130,000 persons, with the Estuary and Bay Farm Island Planning Areas showing the greatest growth.

The City is in the process of completely revising its Comprehensive Plan. This revision will take into account many changes which have occurred since 1968 and will probably tend to lower previous projections. For example, the Southern Crossing of San Francisco Bay is no longer a planning factor and Measure A limits City population density to 17.5 units per acre. Additionally, average family size has been reduced substantially in the last decade.

The Land Use Element will deal with the holding capacity of the City and will provide a basis for estimating the rate at which growth will occur. In the meantime, for the Noise Element, a tentative estimate of 1995 population will assume a continuation of growth at the same rate experienced during the 1970-1975 period. This would add 11,000 persons per decade and bring the total City population to about 98,000 by 1995.

FUTURE NOISE EXPOSURE INVENTORY

Until the Land Use Element is prepared it will not be possible to determine the extent and distribution of 1995 City population. However, it seems reasonable to allocate future population primarily according to the availability of vacant and under-developed land. The following chart shows the distribution of future population among the City's eight neighborhoods.* It should be kept in mind that the totals and distributions are only rough estimates.

Applying the projected decreases in noise levels previously discussed, the future noise environment shows marked improvement. Contraction of surface and aircraft

* For neighborhood boundaries see the Map on pg. 13.

contours provide for substantial reduction in the number and percentage of persons subject to noisy environments. Total population subject to noise up to 60 dB increases from 49.2 percent in 1975 to 73.4 percent in 1995. During this same period, noise reductions will subject 23.5 percent of Alamedans to 60-65 dB (32.1 percent in 1975); 2.4 percent subject to 65-70 dB (13.7 percent in 1975); and only 0.7 percent over 70 dB (5.0 percent in 1975).

1995 ALAMEDA POPULATION SUBJECT TO VARIOUS CNEL (ESTIMATED)

| <u>Neighborhood</u> | <u>Pop.</u> | <u>CNEL in Decibels</u> | | | | | | | |
|---------------------|-------------|-------------------------|----------|--------------|----------|--------------|----------|----------------|----------|
| | | <u>Up to 60</u> | | <u>60-65</u> | | <u>65-70</u> | | <u>Over 70</u> | |
| | | <u>Pop.</u> | <u>%</u> | <u>Pop.</u> | <u>%</u> | <u>Pop.</u> | <u>%</u> | <u>Pop.</u> | <u>%</u> |
| West End | 11,000 | 8,500 | 77.3 | 2,000 | 18.2 | 400 | 3.6 | 100 | 0.9 |
| Ballena Bay | 3,000 | 2,900 | 96.7 | 100 | 3.3 | - | - | - | - |
| South Shore | 12,000 | 11,500 | 95.8 | 500 | 4.2 | - | - | - | - |
| South Central | 15,000 | 14,500 | 96.7 | 400 | 2.7 | 100 | 0.7 | - | - |
| North Central | 12,000 | 9,500 | 79.2 | 2,000 | 16.7 | 400 | 3.3 | 100 | 0.8 |
| East End | 18,000 | 15,000 | 83.3 | 2,000 | 11.1 | 800 | 4.4 | 200 | 1.1 |
| Bay Farm Island | 15,000 | 8,000 | 53.3 | 7,000 | 46.7 | - | - | - | - |
| Naval Air Stat. | 12,000 | 2,000 | 16.6 | 9,000 | 75.0 | 700 | 5.8 | 300 | 2.5 |
| TOTALS | 98,000 | 71,900 | 73.4 | 23,000 | 23.5 | 2,400 | 2.4 | 700 | 0.7 |

GOALS AND POLICIES

This section of the Noise Element contains goals and related policies for the reduction of noise in the City of Alameda. The goals indicate the desired result; policies describe the course of action to be taken by City Officials to achieve the goals.

The goals have been formulated from comments received from residents of the City during the 1975 Goals Study, at the May, 1975 Public Noise Forum and from individual comments and complaints expressed over the years.

GOAL I. ABATEMENT OF UNNECESSARY NOISE FROM AUTOMOTIVE VEHICLES

Policy 1. Enforce noise-emission standards for all types of automotive vehicles established by the California Vehicle Code and by Federal regulations.

Policy 1a. Enforce California Vehicle Code provisions which prohibit modification of vehicular exhaust systems in a way that increases noise emissions.

Policy 2. Reduce noise exposure levels produced by noise emissions from heavy passenger buses.

Policy 3. Reduce noise emissions from city-owned vehicles.

Policy 4. Minimize truck use of residential streets.

Policy 5. Cause silencer lids to be placed across the expansion joints of the bridges.

Policy 6. Request that the State of California construct noise barriers along the southern side of Route 17 Freeway from the intersection of Eighth and Cypress Streets to the intersection of Fifth and Market Streets; and from the Fruitvale Overpass to the 66th Avenue Cloverleaf.

Policy 7. Investigate acoustic needs, effectiveness, esthetic aspects, and possible security problems of noise barriers along selected segments of streets in

the City of Alameda, and also along portions of frontages of schools and other public buildings.

Policy 8. Consider the feasibility of noise barriers along selected segments of the Alameda ramps of the Park Street Bridge, the Fruitvale Bridge, and the High Street Bridge.

Policy 9. Enlist the assistance of the City of Oakland toward the construction of a noise barrier along the southern flank of Alameda Avenue in Oakland.

GOAL II. ABATEMENT OF UNNECESSARY NOISE FROM RAILROAD LINES

Policy 1. Enlist the cooperation of the railroad operators to attain the following objectives:

- a. Satisfaction of Federal standards for rolling stock.
- b. Maintenance of roadbed, rail joints, switches, etc., to avoid excessive wheel-to-rail-to-roadbed noises and vibration.
- c. Minimal use of acoustical signals that can be heard over an unnecessary large area.

Policy 2. Participate in all deliberations by decision-making bodies on future extensions of rail transit lines through Alameda to ensure that CNEL not exceed 65 dB through horizontal or vertical separation from existing noise-sensitive land uses and/or roadbed shielding.

Policy 3. Encourage the removal of rail lines through Alameda which prove to be unnecessary.

Policy 4. Consider the possibility and advisability of the construction of noise barriers along selected segments of existing railroad lines.

GOAL III. ABATEMENT OF UNNECESSARY NOISE FROM INDUSTRIAL PLANTS

Policy 1. Reduce noise emanating from industrial plants or shield the community against such noise.

Policy 2. Require, by ordinance, that plan approvals and building permits for new industrial plants within the City be made contingent on a certified assurance that the proposed facility will not cause the total annual CNEL in any existing owner-occupied dwelling to rise above 65 dB, or more than 3 dB above the CNEL prevailing there at the time of the application, whichever is lower.

Policy 3. Request that Noise Elements of adjacent cities and Environmental Impact Reports and Statements of projects proposed therein describe and disclose fully any significant noise impact on the City of Alameda, and encourage the adoption of noise-mitigating measures.

GOAL IV. ABATEMENT OF UNNECESSARY NOISE FROM MISCELLANEOUS SOURCES

Policy 1. Enforce Federal and State Noise Standards for all miscellaneous sources of noise in the City.

Policy 2. With the cooperation of the U.S. Coast Guard and the City of Oakland, enforce Noise-Emission Standards for engine-driven vessels.

GOAL V. ABATEMENT OF UNNECESSARY NOISE FROM AIRPORT AND FLIGHT ACTIVITIES

Policy 1. Request abatement of unnecessary noise from and unnecessary flights to and from the San Francisco International Airport (SFO).

Policy 2. Request that nighttime departures from SFO be minimized, except for departures by "quiet" aircraft and along "quiet" departure paths, over the water of San Francisco Bay, to at least 8,000 feet altitude.

Policy 3. Urge the Federal Aviation Administration to explore and, if feasible, to adopt the following changes in departure paths from the San Francisco

International Airport:

1. Maximum use of paths substantially identical to the present QUIET SID.
2. Maximum use of paths substantially along the SFO VOR Radial 360.
3. Maximum use of paths passing over the Naval Air Station Alameda in preference to paths passing over the center of the City of Alameda.
4. Maximum use of paths located eastwardly of the SFO VOR Radial 029.

Policy 4. Urge the Federal Aviation Administration and the Airports Commission of the City and County of San Francisco to provide necessary navigational aids that might be required to implement two-segment ILS approaches to SFO Runway 19-Left.

Policy 5. Urge abatement of unnecessary noise attributable directly or indirectly to the activities of the Naval Air Station Alameda.

Policy 6. Urge abatement of unnecessary noise from sustained test runs and runups of aircraft engines on the ground at the Naval Air Station.

Policy 7. Urge abatement of unnecessary noise from the Oakland Airport, attributable to sustained test runs and runups of aircraft engines on the ground.

Policy 8. Urge abatement of unnecessary noise from and unnecessary flights to and from Oakland Airport.

GOAL VI. UNDERTAKE A COMPREHENSIVE APPROACH TO REDUCE THE EFFECTS OF NOISE

Policy 1. Apply noise criteria to land use planning.

Policy 2. Implement mitigating measures for noise control.

MITIGATING MEASURES FOR NOISE CONTROL

INTRODUCTION

In the City of Alameda the total annual exterior CNEL, on the whole, exceeds 55 dB. The few exceptions are sheltered areas of gardens, yards, and cul-de-sacs. In some areas of the City, the prevailing CNEL has been observed to exceed 65 dB. The purpose of this section is to recommend methods of achieving an overall improvement of the environmental quality of the City by reducing noise and its effects. Specific actions which may be taken by the City are described under the following general categories: organizational actions, surface noise and aviation noise.

There are five specific means of achieving noise-impact mitigation in the City:

- quieting the noise at the source.
- removing the source of the noise.
- barring the path of the noise from its source to the recipient.
- shielding the recipient of noise.
- avoiding the placement of potential recipients of noise within the impact area of unavoidable, unabatable, irremovable noise.

Quieting the Noise at the Source

Federal and State regulations are currently reducing, and can be expected to reduce further, the certificated limit of noise emitted by individual automotive vehicles on land and on the water, and by aircraft. Federal, State and local regulations exist, or are in the making, to curb any excessive noise produced by improper operations of vehicles and aircraft. Consequently, it should not be assumed that future automotive vehicles or aircraft, as manufactured and placed in service, will be noisier than, or even as noisy as, those manufactured and placed in service in the past, and Alameda should not permit any future increase in noise-exposure levels in the City.

Removing the Source of the Noise

In some cases, fixed sources of noise can be relocated. One example would be to develop new truck routes that do not extend through residential neighborhoods. Where trucks and heavy auto traffic must pass through residential areas consideration could be given to increasing front setbacks for new buildings, especially the upper levels of multi-storied buildings. Other noise generators subject to possible removal are the gun range, by relocation; barking dogs, by training and enforcement; and playgrounds, by changing play areas and hours. Obviously, these possible steps have other implications which should be weighed carefully before an action program or policy is developed and implemented.

Barring the Path of the Noise from its Source to the Recipient

Sound propagates by line of sight and along bent scattering paths. A barrier placed close to the source of a sound and a barrier placed close to a recipient can be an effective means for diminishing the intensity of the impacting sound at the site of the recipient. The effectiveness of a barrier is impaired when placed somewhere midway between the source and the recipient.

Barriers may be undesirable in cases where they create the appearance of stark walls. They may also be undesirable where they may create problems of security to unguarded areas and possible problems of entrapment of people in confined places. These and other considerations must be weighed carefully in any planning for noise barriers.

Shielding the Recipient of Noise

In some cases, noise from a particular source may have been reduced to the lowest reasonable level or have been screened along its path but still presents a problem. In these cases, it is possible to achieve further noise reduction by insulating buildings intended for human occupancy. This is an effective method of mitigating existing problems that are not reasonably subject to any other method.

Avoiding the Placement of Potential Recipients of Noise into the Impact Area of Unavoidable, Unabatable, Irremovable Noise

One of the major purposes of the Noise Element is to formulate a land use policy relative to noise exposure. This policy should be influenced by existing and expected noise levels and be oriented to the establishment and location of land uses in a manner which is compatible with these levels. The land use policy which has evolved from the Noise Element is contained in a following section headed "Noise Criteria for Land Use Planning."

Within the context of these five categories of noise mitigation, an action plan has been formulated to deal with excessive noise in the City of Alameda. The plan describes general organizational actions which should be undertaken and indicates specific approaches to the reduction of surface and aviation noise.

ORGANIZATIONAL ACTIONS

One of the first steps in combating noise within the City of Alameda is to organize the City resources to be oriented to the problems and effective control of noise. Although Federal, State and County agencies are dealing with some of the sources of noise effecting Alameda, there are significant aspects of noise that can be addressed locally. Implementation of the recommendations in this section primarily require legislative and administrative action by the City.

Assign Responsibility for Coordination of Noise Control Program

Background Information: The City's noise control effort will include several aspects which functionally can be carried out by existing City departments. Technical assistance could be provided by the Engineering Department, enforcement of Vehicle Code and Noise Ordinance by the Police Department, application of insulation standards by the Building Inspection Division, and implementation of land use regulations by the Planning Department. Also, there may interest in noise monitoring and enforcement by Alameda County. This sharing of responsibility among departments, if all or part of noise control is undertaken by the County, still leaves the need to designate one department which would have primary responsibility to coordinate and draw upon the resources of the other departments, and to coordinate City activities with the County.

Recommendation: It is recommended that the City Manager give consideration to the respective work loads and staff resources of the City departments and designate one department to coordinate and oversee the City's overall noise control program or to coordinate such a program with Alameda County.

Establish Noise Information, Monitoring and Abatement Functions

Background Information: The noise environment of the City should be surveyed periodically in order to keep abreast of its current condition. Techniques for mitigation on an individual and Citywide basis should be developed and promulgated, and violations of codes and ordinances should be detected and abated, or to encourage and cooperate with Alameda County in providing such assistance.

Recommendation:

1. Consider the establishment of an Environmental Noise Standards Section in an appropriate department of the City of Alameda to monitor the noise environment of the City and to provide technical assistance to City departments and citizens of the City of Alameda who are in need of specialized advice in the field of noise abatement.
2. Consider the establishment of a Noise Abatement Unit to be assigned five principal responsibilities:
 - a. To identify vehicles that appear to violate noise-emission standards established by the California Vehicle Code; and identify and prosecute violators of the Vehicle Code prohibition against modification of exhaust systems in a way that increases noise emissions.
 - b. To verify the noise levels produced by vehicles so identified under controlled conditions, with the assistance of the above-proposed Environmental Noise Standards Section.
 - c. To require the correction of any defect found under controlled conditions and the certification of compliance by the above-proposed Environmental Noise Standards Section.
 - d. The proposed noise-abatement unit should be assigned the responsibility of enforcing existing Federal noise standards for miscellaneous sources of noise, such as the following:
 - i. construction equipment.
 - ii. waste-disposal services.
 - iii. motor vehicles off the public streets.
 - iv. stationary machinery and equipment.
 - v. mechanical repair activities.
 - vi. powered model vehicles.
 - vii. miscellaneous transient noise from ground-based sources.
 - e. To coordinate airport noise monitoring.

Purchase of Quiet Vehicles and High-Quality Maintenance for City-Owned Vehicles

Background Information: The City government has an opportunity to exert leadership in noise control by setting an example of self-regulation.

Recommendation: The City of Alameda should establish noise criteria for the evaluation of vehicles considered for purchase by the City, such as police vehicles, trucks, and specialized vehicles for street cleaning and maintenance.

Such criteria should be combined with Federal and State criteria, and should establish additional competitive incentive noise criteria to induce bidders to provide lower noise levels for items not subject to Federal or State laws.

Verification of the actual noise performance of such vehicles should be established as a mandatory part of the routine maintenance schedule.

Specifications for maximum noise-level tolerances should be established to determine the need for repair or replacement of a component that has become excessively noisy in service.

Update Noise Insulation Ordinance

Background Information: The present Noise Insulation Ordinance exempts detached single-family dwellings which are not constructed as part of a subdivision requiring a final subdivision map and which are not located within a high exposure area.

Recommendation:

1. The City of Alameda should refine and perfect the application of its current Noise Insulation Ordinance and should simultaneously study the possible applicability of the noise-reduction requirements therein to all detached single-family dwellings.

2. In particular, the City of Alameda should acquaint all builders, including individuals who seek building permits for single-family detached dwellings that are not part of a subdivision, with the relatively inexpensive improvements that afford compliance with the existing noise-insulation ordinance and, hence, enhance the livability and value of a single-family detached dwelling from the point of view of both noise reduction and cooling-and-heating energy requirements. Publication of a simple booklet is suggested to assist individual builders.

Establish Noise Insulation Requirements for Non-Residential Buildings

Background Information: While recently proposed schools have received professional advice on an individual basis as part of the current Noise Element project, permanent noise-insulation requirements should be set up by city ordinance.

The survey of noise-insulation requirements of existing schools in Alameda is likely to reveal serious deficiencies in outdoor-to-indoor noise leakage and interior acoustical deficiencies in room-to-room noise transmission and the reverberation characteristics of individual classrooms.

Recommendation: The City of Alameda should establish noise-insulation requirements for non-residential buildings for which no State requirements exist, such as office buildings, schools, institutional buildings of all kinds, and industrial plants in which the interior noise meets State regulations, but which are affected adversely by intruding exterior noise.

SURFACE NOISE

The most significant noise problem in Alameda, in terms of numbers of people affected, is generated by ground sources, particularly motor vehicles. This section deals with noise emanating from motor vehicles, boats, railroads, industrial uses, aircraft engine testing and miscellaneous sources.

Street Noise

• Heavy Traffic and Trucks

Background Information: Alameda is a city in which space is limited. Virtually all of its important traffic arteries are bordered, at least in part, by some noise-sensitive residential areas. A great deal of study and planning has already gone into the development of at least two major east-west arteries and approximately four north-south traffic arteries. The present noise study has identified an additional need, namely, the problem of noise, which should be taken into consideration in identifying less noise-sensitive routes, especially for heavy commercial truck traffic. Additional needs are the adequate setbacks of building lines and the possible terracing or staggering of two-story and multi-story dwellings along some streets.

Recommendation

1. Noise-Compatible Truck Routes. The City of Alameda should plan and develop at least one major east-west truck route that is free from any major noise impact on residential blocks. A study of a westward extension and upgrading of Clement Avenue is suggested to take a heavy noise burden off the residential area along Buena Vista Avenue.

Other similar truck-route developments should be planned to relieve such north-south streets as High Street from their present heavy noise burden.

2. Adequate Setback of the Building Line. The City of Alameda should establish supplementary, noise-oriented criteria for the specification of an adequate setback of building lines for various types of dwellings from the center-line of the nearest traveled lane (or the curb) as a function of current projected traffic-noise levels.
3. Terracing or Staggering of Two-Story and Multi-Story Dwellings. The City of Alameda should give consideration to the possible terracing away from the street of upper stories of two-story and multi-story buildings, depending on current and projected traffic noise on a street, as well as other architectural parameters, so that the lower stories of such buildings may serve as noise shields against street noise for the upper stories.
4. Barriers Along Selected Streets in Alameda. It is suggested that the City of Alameda consider the feasibility of noise barriers along certain segments of streets in Alameda. No precise detail can be offered at this time, because the construction of a noise barrier within a city is a matter of individual study and the balancing of numerous esthetic and security aspects against the acoustical effectiveness of a barrier. In terms of broad suggestions, the following are offered:
 - (a) A noise barrier on both sides of the southern portion of the Bay Farm Island Bridge, beginning at the point where the Bridge enters Bay Farm Island, along the curve and off-ramp, and along Island Drive, from Doolittle Drive to Mecartney Road, limited to the extent that differences in pad

elevations above Island Drive and Mecartney Road do not obviate the necessity for a barrier.

- (b) Noise barriers along the frontage of several schools. Typical examples are the sides of Mastick School that are exposed to Santa Clara Avenue and Bay Street, the Central Avenue frontage of Encinal High School, the High-Street frontage of St. Philip Neri School, and many others. In some instances, noise protection by barriers may be sufficient in front of main entrance doors only, so that noise suppression may be afforded without interfering with an ample intake of ventilation air into the school building. While this has not been customary in Alameda, such an arrangement is not unusual in some subtropical countries, where security, noise abatement and interior ventilation must be combined.
5. Barriers Along Bridge Ramps in Alameda. The City of Alameda should give consideration to the erection of attractively designed noise barriers to protect residential and institutional neighbors of the Alameda ramps of the Park Street, Fruitvale and High Street Bridges.
6. Barriers Along Streets in Oakland. The City of Alameda should enlist the assistance of the City of Oakland toward the construction of a noise barrier along the southern flank of Alameda Avenue in Oakland from where intense trucking noise penetrates the residential Marina Drive area in Alameda.

If and when Doolittle Drive is widened and impacted by objectionable noisy traffic, the City of Alameda should enlist the cooperation of the City of Oakland to provide a noise barrier along Doolittle Drive, beginning from the Oakland City limit and ending at the southern extremity of the southeastward turn of Doolittle Drive at the mouth of the Airport Channel (total length approximately 1,800 feet).

7. Freeway Barriers. The City of Alameda should encourage the State Department of Transportation to construct barriers on the elevated portions of Freeway Route 17 in Oakland, from the intersection of Cypress Street and Eighth Street to the intersection of Fifth Street and Market Street; and from the Fruitvale Overpass to the 66th Avenue Cloverleaf.

- Heavy Passenger Buses

Background Information: Bus services within the City of Alameda are operated by AC Transit. The coaches employed are powered by highly efficient, but extremely noisy, diesel engines.

Recommendation: The City of Alameda should enlist the cooperation of the AC Transit District to achieve:

1. Reduction of noise emissions from the currently-operated diesel-powered AC Transit coaches by (1) the use of sound-absorbing materials in the engine compartment and (2) improved exhaust mufflers.
2. Introduction of electric trolley coaches on routes on which the headway between successive coaches is sufficiently close to render the installation of a trolley-coach system economically feasible and advantageous.
3. Placement of bus stops at least 150 feet "downstream" of each school site so that heaviest braking and accelerating noises do not occur in front of the school or directly across the street.
4. Consideration of the avoidance or removal of traffic signals, other than signals synchronized for constant-speed traffic flow, from intersections at which schools are located, and restriction of traffic flow on cross-streets thereat.

• Noise Abatement on Bridge Structures

Background Information: Some of the highway bridges spanning the Estuary are flanked by noise-sensitive dwellings and institutional buildings at their Alameda end. In virtually each instance a predominant source of noise appears to be an expansion joint in the traveled way close to the Alameda end of the bridge.

Recommendation: The City of Alameda should endeavor to have the expansion joints bridged by resiliently supported silencer lids, so that the noisy jolt, currently experienced by residents near the bridge each time a vehicular wheel crosses the expansion joint, be suppressed.

Enforcement of Noise-Emission Standards for Engine-Driven Vessels

Recommendation:

1. The proposed noise-abatement unit should identify engine-driven vessels, especially motorboats, including, but not limited to, the so-called "drag boats" in the eastern Estuary and the San Leandro Channel, that appear to violate the noise-emission standards established by the California Code for engine-drive vessels.
2. The City of Alameda should enlist the cooperation of the City of Oakland or Alameda County to verify the noise levels produced by vessels so identified under controlled conditions, and to require the correction of any defect found under controlled conditions. Each agency should perform such noise-control functions with respect to boats operated or berthed within its limits.
3. The City of Alameda should also enlist the cooperation of the U.S. Coast Guard in the identification of offending non-resident vessels, if such operation is within the power and responsibility of the U.S. Coast Guard.

Noise Abatement of Railroad Lines

Background Information: Noise-emission standards for locomotives and other equipment of interstate railroads are the subject of recent actions by the Environmental Protection Agency under the Federal Noise Control Act of 1972.

Recommendations:

1. The City of Alameda should enlist the cooperation of the railroad operators to ensure that the rolling stock meets Federal standards.
2. The City of Alameda should survey the existing trackage in the City, and request the railroad operator to maintain roadbeds, rail joints, switches, intersection components, and miscellaneous equipment in such a condition as to avoid excessive wheel-to-railbed noises and vibrations.
3. The City of Alameda should ask the railroad operator to reduce the use of acoustical signals to a legally necessary minimum.
4. The City of Alameda should enlist the cooperation of the railroad operator to provide noise barriers along the eastern side of the approach to the Fruitvale railroad bridge and on the bridge itself to protect the Marina Drive residential area from excessive noise.
5. The City of Alameda should also urge the construction of a noise barrier along the south side of the railroad spur track paralleling Alameda Avenue in Oakland. A single noise barrier there should be adequate to protect the Marina Drive residential area in Alameda from the noise of both the railroad and the truck traffic on Alameda Avenue itself.
6. The City of Alameda should enlist the cooperation of the railroads in removing rail lines which no longer are needed.

Industrial Noise

Background Information: Industrial noise in Alameda emanates primarily from sources long-established in an industrial area in the northern part of the

City. There are no known means for removing that source still farther away from the recipients of such noise.

Likewise, the industrial noise from factory-like facilities at the Naval Air Station cannot be readily moved farther away from recipients of their noise. However, every effort should be made to locate new noisy industrial activities, both large and small, in relatively noise-insensitive areas, or in areas that are separated by existing noise barriers from noise-sensitive areas. Industrial noise heard from across the Estuary emanates from an extended and broad area within the City of Oakland.

The source of the most intrusive noise from Oakland is the industrial area in Oakland opposite the Marina Drive area in Alameda and the area of Port facilities opposite the residential area at and near the Naval Air Station Alameda. There are no practicable means for removal of such noise sources, but noise abatement at the source is possible.

It should be anticipated that some of the commercial-industrial area along and behind the Oakland waterfront might become the site for additional industrial plants and activities. Any planning therefore should include means for noise suppression.

The Todd Shipyards emit a substantial amount of noise, much of which impinges on the residential area on and adjacent to the Naval Air Station Alameda. Some of that noise can be abated.

While it is recognized that the use of impact tools (such as in riveting, hammering, chipping, etc.) and the operation of cranes, rail vehicles, compressors, power generators, grinding, sand-blasting, the venting of steam and compressed air, the running of engines, motors, and pumps, and other noise-producing activities, are part of the construction and repair business of a shipyard and ship-repair facility, it is suggested that the noise emissions of many, if not all, of such noise sources can be controlled or abated by appropriate engineering or operational measures.

Another source of high-intensity sounds is the occasional use of extremely loud bullhorns or paging-loudspeakers at any hour of the day and night.

Noise emanating from the Sea-Train Facility of the Port of Oakland has an impact second only to that of Todd Shipyards, on the residential area in and near the Naval Air Station Alameda.

Recommendations:

1. The City of Alameda should initiate a program to identify objectionable individual industrial noise sources and enlist the cooperation of the respective owners and operators toward constructing attractively designed noise barriers wherever possible to protect residents and the by-passing public from excessive noise.
2. The City of Alameda should make approvals and building permits for new industrial plants within the City limits contingent on a satisfactory assurance by the proponent that the location, configuration, orientation, and operation of the proposed facility will not cause the total annual exterior CNEL in any existing owner-occupied dwelling to rise above 65 dB, or more than 3 dB above the CNEL prevailing thereat at the time of the application, whichever is lower.
3. The City of Alameda should make appropriate representations to adjacent cities, asking them to prepare and publish legally and substantively adequate Noise Elements for their respective General Plans, together with Environmental Impact Reports (and, where federally funded, Environmental Impact Statements) that describe and disclose fully any significant noise impact on the City of Alameda, and any part of the City of Alameda, by industrial plants currently existing in each of said cities, and industrial plants proposed for local approval by said cities.

The City of Alameda should then respond with its critique and with constructive recommendations for measures regarded as necessary for the protection of the City of Alameda and its citizens.

4. The City of Alameda should enlist the cooperation of Todd Shipyards to achieve a noise reduction at the source, or the setting up of protective noise barriers that would protect people in Alameda without reflecting undue noise into the residential areas of the City of Oakland.

The shipyard operator should also be asked to install a network of low-intensity paging devices, or install the universally used system of personal radio-paging devices, and to assign to the high-intensity loudspeaker network emergency functions only.

5. The City of Alameda should seek the cooperation of the Port of Oakland, and its lessees and operators at the Sea-Train Facility, to suppress or mitigate four of the most prominent apparent sources of noise at the Facility, namely:
 - (a) Abatable noise from mechanical repair work and other inherently noisy operations.
 - (b) Abatable noises from the operation of cranes.
 - (c) Abatable wail of sirens.
 - (d) The noisy dropping of heavy loads from an excessive height.
6. The City of Alameda should enlist the cooperation of the operators of the scrap yards on the Oakland side of the Estuary to have the operation of their magnetic cranes so controlled that the scrap material is released at a low elevation above the accumulation pads and thereby reduce the noise caused by dropping scrap material from excessive heights.
7. The City of Alameda should seek the cooperation of the Owens-Illinois Company and the City of Oakland toward reducing the noise emission of the

plant itself and toward providing a suitable shielding of the yard facilities (including, among others, a rail spur) and the road frequented by trucks on the Estuary side of the plant), so that the excessive noise impact (nearly 70 dB CNEL) produced by the Owens-Illinois plant in Oakland along the entire water front of residences along Marina Drive in Alameda be reduced.

The determination of the specific target value of the noise exposure level should be consistent with the due consideration of the low-octave-band content of the noise emission of the glass plant. Additional attention should also be given to the reported post-midnight "clearing" of the stacks of the factory.

Noise Abatement at Facilities Where Aircraft Engines are Subjected to Sustained Test Runups on the Ground

Background Information: Aircraft engines emit intense noise in connection with repair and maintenance activities on the ground. There are essentially two sets of circumstances in which engines need to be run up while on the ground, as follows:

- (1) Off-aircraft: In test cells, following a major engine overhaul;
- (2) On-aircraft: Primarily for purposes of so-called "engine-trim" adjustments.

In general, off-aircraft test-cell runs last longer, for one or several tens of minutes; on-aircraft "trim" runs usually require but a few minutes, but on occasion they, too, may last ten to twenty minutes.

Test cells can be quieted by suitably designed noise-suppressor structures, appropriately located and oriented.

The noise impact of engine run-ups "on-aircraft" can be minimized by the use of stationary or mobile noise suppressors, and by placing the aircraft at a

suitable location and orienting it so that either distance or the shielding effect of an obstacle, or both, serve to diminish the impingement of noise on a noise-sensitive area.

There are two major groups of engine ground-runup and test activities that can and do affect the City of Alameda, namely: the Naval Air Station Alameda and the Oakland Airport.

- The Naval Air Station Alameda

Background Information: The Naval Air Station Alameda houses the Naval Aircraft Rework Facility (NARF) and various operational squadron activities.

Over the years the NARF has constructed and used effective noise-suppressing test cells for aircraft engines. Test cell operations are generally limited to daytime hours, from 7:00 a.m. to 3:30 p.m., but, in instances of urgent need, they may extend through the evening hours to approximately 6:00 p.m., with only a few exceptional runs until midnight (none reported since January 1, 1975). With increasing effectiveness of noise-suppression test cells, complaints from citizens have reportedly decreased over the years.

On-aircraft high-power jet-engine runups without sound suppressors have been limited to daytime, with no sustained runups at night. Other limitations restrict evening and night runups of turboprop and reciprocating engines. Runups are generally performed at remote locations on the base, with the exhaust stacks pointing toward San Francisco Bay.

The Department of Defense has developed, or has caused to be developed, noise suppressors for most recent types of naval and other military aircraft. The Naval Air Station Alameda and the various facilities thereat have constructed or acquired noise suppressors for most but not all types of aircraft that are in operational use at the Station.

The Naval Air Station advises that, in cooperation with the NARF and the Naval Facilities Engineering Command (Western Division), it has programmed projects to formulate and implement foreseeable noise suppressor requirements.

The NAS Alameda issues, from time to time, an instruction memorandum entitled "Aircraft Noise Abatement and Control Program" to make known its policies and procedures regarding aircraft noise abatement and control.

Recommendations: It is recommended that the City of Alameda support and encourage the on-going effort of the Naval Air Station Alameda to hold to a minimum the noise emitted by aircraft engines during stationary runs on the ground.

The City of Alameda should enlist the cooperation of the Station in verifying from time to time, the noise-suppression effectiveness of existing test cells, and in improving further the noise reduction afforded by the existing test cells and any new test cells.

The City of Alameda should ask for the continued vigilance of the Station to ensure that on-aircraft engine runups be restricted to remote areas of the Station, and to maintain a policy for the use of noise suppressors on all jet aircraft whenever possible.

Inasmuch as the Station is situated within a few blocks from densely populated residential and business areas of the City of Alameda, the City of Alameda should support continuing efforts by the Station to obtain noise suppressors for each type of aircraft at the time of the first assignment of such aircraft to the Station. The Naval Air Station is probably the most important dockside Naval Aircraft Rework Facility on the Pacific Coast and serves, in addition, several important operational squadrons and reserve units.

• The Oakland Airport

Background Information: The Oakland Airport is provided with four facilities in which aircraft engine runups are performed on the ground, as follows:

1. An Engine Test Runup Facility at the Northwestern Extremity of the Northfield. There have been extensive complaints about prolonged engine runups at that facility, some of them late at night and in the pre-dawn morning hours. Some of the noise recordings made by the noise-monitoring crew of the Port of Oakland at the water's edge near the western end of Runway 11-29, about one and one-half miles away from the engine test rig, manifest apparently identifiable prolonged "noise signatures" attributable to the test facility. The facility is located conveniently close to some maintenance facilities on the Northfield, but its location is also close to the Eastshore area of the main island of Alameda and the old uplands residential community on Bay Farm Island that lies about halfway between the runup cell and the aforementioned noise-monitoring location of the Port of Oakland.
2. The On-Aircraft Engine Runup Activity by Air California in the Vicinity of Hanger 6 on the Northfield. Air California reportedly performs only the very minimum of essential engine runups (approximately 11 or 12 per year) for engine-trimming purposes on the ground. With the tightening of the fuel crisis in early 1974, the company initiated a maintenance program which all but eliminates routine engine runs on the ground, except for infrequent runs that are necessitated by unforeseen engine replacements and fuel-control repairs. Air California is equipped to perform, and does in fact perform, much of the trim check of its two-engine Boeing 737 aircraft during cruising flight, so that only the post-adjustment check, if any, remains to be performed on the ground. Data from Air California indicated that its maintenance department endeavors to orient the aircraft on the ground in the presumably most advantageous manner possible for noise minimization for residents of Alameda.
3. The World Air Center Facility. The lack of predictable activity at the World Air Center Facility has rendered noise monitoring impractical, and any evaluation of noise complaints must remain in abeyance until activity at the Center attains a level at which precise measurements can be performed at the time of the engine runups.

4. The Bayside Runup Pads. Runup pads near the thresholds "29" and "11" of the jet runway are occasionally used for on-aircraft engine runups.

Current engine ground run policies are reportedly governed by Oakland Airport Directive 616.3, titled "Engine Runups."

Recommendations:

1. An Engine Test Runup Facility at the Northwestern Extremity of the Northfield. The City of Alameda should request that the facility be either moved to the vicinity of the threshold of Runway 29, or that it be enclosed in a sound-suppressing structure with its opening facing in the southwardly or south-east-eastwardly direction.
2. The On-Aircraft Engine Runup Activity by Air California. If noise measurements should indicate that the levels produced in the Eastshore residential area of the main island of Alameda or in the residential community on Bay Farm Island are excessive and repetitive, then the City of Alameda should enlist the cooperation of the Port of Oakland to install necessary noise-suppressing devices near Hanger 6 for the use of Air California, so that Air California can perform its operations without contributing to excessive nighttime noise levels in Alameda.
3. The World Air Center Facility. The City of Alameda should obtain from World Airways accurate noise data during typical on-aircraft engine runup operations. If noise abatement is necessary, the City of Alameda should use the data to make recommendations to World Airways and the Port of Oakland for effective means of noise mitigation, if such are necessary.
4. The Bayside Runup Pads. The City of Alameda should enlist the cooperation of the Port of Oakland toward a maximal use of the runup pad near the threshold of Runway 29, with the sector of maximum noise intensity of the aircraft or powerplant oriented toward the Bay.

- **Airport Noise Barriers**

Recommendations: The City of Alameda should identify locations where noise barriers of reasonable height could effectively shield noise-sensitive residential and institutional areas and seek to make suitable arrangements to have such barriers erected. The opportunities for such barriers in the City of Alameda are limited. Among samples that appear promising at this time are the following:

- (1) Barriers or other shielding structures on the western side of Encinal High School, intended primarily to protect the playyard and any open doors and windows in the ground floor of the school, supplementing any needed acoustical improvement of the building.
- (2) Architectural design provisions for the location and orientation of future commercial-industrial buildings in the broad buffer zone reserved for such uses in the area adjacent to the western end of Runway 11-29 at the Oakland Airport that will provide additional shielding of the residential community there from thrust-reversal noise of landings on Runway 29 and initial thrust-application noise of takeoffs on Runway 11.

- **Barking and Howling Dogs**

Background Information: Citizens have complained about dogs barking and howling, especially during the night. A distant vehicle or aircraft, the sound of a door or window closing, the steps of a passer-by, appear to be sufficient to precipitate a general uproar by barking and howling dogs.

Any young dog can be taught, by well-known and conventional humane training methods, to keep from barking unless a stranger intrudes. A trained watch-dog does not bark and howl without a good reason.

Recommendation: The City of Alameda should continue to issue a warning to owners of barking and howling dogs reported by neighbors and issue citations, as appropriate.

• The Island Gun Range

Background Information: A gun range is located on Bay Farm Island, adjacent to the backyards of private residences on Magnolia Lane. The range operates daily from 10:00 a.m. to 5:00 p.m. Residents on Magnolia Lane report excessive noise.

Impact noise levels such as those produced by ballistics cannot be described in terms of CNEL. Precision sound-level meters which are equipped with a slow-response circuit do not respond to a shot because of the extremely short rise time of the sound pressures. However, the subjectively perceived noise would suggest that the gun range and residential dwellings are mutually incompatible.

Recommendation: Unless a high sound barrier can be constructed to muffle the noise, it is suggested that the City of Alameda consider an alternate location of the gun range, where no one would be disturbed.

AVIATION NOISE

This plan endeavors to identify areas of possible improvement of the noise-exposure levels in Alameda through the removal or diverting of aeronautical sources of noise from the City in a manner that will not impair the safety or efficiency of airports or the air-traffic-control system, and that will not impose or shift significant new noise burdens on the other communities.

Aviation noise affecting the City of Alameda primarily is related to departures and landings at San Francisco International Airport, Alameda Naval Air Station and Oakland Airport.

The San Francisco International Airport

Background Information: The San Francisco International Airport has an annual passenger volume which has increased from about 14 million to over 17 million during the past five years. It serves approximately 330 air-carrier takeoffs and 330 air-carrier landings per day, totaling 240,000 air-carrier operations per year. On an annual average, approximately 120 or more San Francisco departures per day cross the Alameda shorelines of the East Bay on eastbound and northeastbound climbs. In the course of about fifty days per year, during the southerly stormwind conditions, up to 300 arrivals per day cross the western portion of Alameda in their final approaches to the San Francisco International Airport.

The Federal Aviation Administration, the Airports Commission of the City and County of San Francisco and its Airport Management, the air carriers, the City of Alameda, and the residents of Alameda and companies doing business in Alameda, have exerted and are exerting considerable efforts to reduce the noise-exposure levels in the City of Alameda resulting from San Francisco air-carrier departures without impacting any residential areas in other communities with CNEL's of 65 dB or higher.

It is also recognized that the operational capacity of the San Francisco runway system affords means for doubling the present passenger volumes, assuming, of course, that this can be accomplished within the constraints of diminishing jet-fuel resources. However, even were the fullest expansion of the potentially available passenger capacity of the San Francisco International Airport attained with the use of aircraft of current production type, pending Federal legislation heralds a substantial decrease by approximately 10 dB in the CNEL's produced at any given point in the environs of the San Francisco International Airport, including the City of Alameda, during the period from 1972 to 1985.

Recommendation: The City of Alameda should urge air carriers, FAA and the Airport management to develop and practice climb and final approach procedures that would result in decreased noise levels in Alameda from such operations, without reducing safety or increasing noise levels in other communities.

The Naval Air Station Alameda

Background Information: Past and continuing efforts by the Naval Air Station Alameda and the FAA for a minimization of the noise impingement upon the Cities of Alameda and Oakland are recognized.

In particular, it is noted that jet-penetration paths in the Newark area have been and, it is hoped, can be further adjusted to make way for an eastward displacement of eastbound San Francisco LINDEN and SHORELINE departures.

It is also noted that Runway 26 at the Naval Air Station is used for landings solely when wind conditions make its use unavoidable, and that "bounce" landings on Runway 25 are not permitted.

It is noted lastly that use of the "break pattern," in which an initial approach to Runway 31 at the Naval Air Station is followed by a left turn, an overflight of the Webster Street area of Alameda, and a left turn and landing on Runway 25

is performed only as a last resort, when it becomes an inescapable necessity. However, residents of an area extending as far as Sherman Street and Grand Street have complained publicly that broad, sweeping turns by carrier-type fighter aircraft have occasionally flown noisily over their residences.

Recommendation:

1. The City of Alameda should urge the Department of the Navy to continue the mission policy of the Naval Air Station by focusing on fleet-support and naval aircraft rework activities, and place less emphasis on instructional flight activities and tactical training activities at that Station. It would appear that this is no more than a restatement of existing Naval policy.
2. The City of Alameda should urge the Department of the Navy to establish visual aids to facilitate the alignment of arriving Naval aircraft with Webster Street during "break-pattern" approaches, in order to avoid broad sweeping turns over the central parts of the City of Alameda.
3. The City of Alameda should ask the Naval Air Station to include the City in the planning for community noise-monitoring microphone locations for the currently proposed Navy noise-monitoring plan for the Station.

The City of Alameda should ask the Naval Air Station to provide adequate observational data from the proposed Navy noise monitoring so that the City is able to contribute constructive comments and suggestions from time to time.

4. The City of Alameda should ask the Naval Air Station to supply to the City, from time to time, available updated information on any significant changes in the noise impact pattern of the Station. Any such data relative to the City of Alameda should then be examined by the Planning Department of the City of Alameda with regard to their possible influence on land-use planning within the City.

The Oakland Airport

Background Information: The noise exposure of the City of Alameda and some of its citizens and residents can be reduced by placing a greater distance between the sources of noise related to the Oakland Airport and the potential recipients of noise in Alameda.

Recommendation: The City of Alameda should urge the Airport Management to undertake, or request the appropriate agency to undertake, the following activities in order to reduce excessive noise levels affecting existing and potential residents of the City.

1. Encourage the use of aircraft certificated with Federal Aviation Regulations (FAR) Part 36.
2. Ensure that certification limits of FAR 36 are actually complied with at the Oakland Airport.
3. Rigorous enforcement and refinement of Port of Oakland and FAA operating policies and rules relative to prohibitions against certain aircraft operations on Runways 09 and 27.
4. Prohibit intersection takeoffs on Runway 27-Left and 27-Right.
5. Preferential use of runways on the Northfield when weather and traffic permit.
6. Prohibit flight-training operations by jet aircraft, and prohibit any training flights at night.
7. Construct a conveniently accessible facility for business jets and executive aircraft in the vicinity of the Airlines Terminal.
8. Upgrade a potential supplemental runway for use when Runway 29 is closed for takeoffs.

9. Prohibit noisy engine ground runs at night.
10. Relocate the OAK VOR transmitter or add another VOR, if such relocation or addition is necessary to achieve a more efficient noise-abatement climb path.
11. Require extended (or otherwise modified) straight climbout of eastbound Oakland departures from Runway 29.
12. Relocate the ASR-7 radar antenna westward, if such relocation is necessary to eliminate the temporary disappearance of SFO departure "targets" during overflight over the center of the Oakland Airport.
13. Install visual approach-slope indicators (VASI) Runways 09, 27, 11, and 29.
14. Install a ceilometer in the vicinity of Runway 29.
15. Install a runway-visibility transmissometer near the touchdown zone of Runway 09-Right.

STRUCTURAL IMPROVEMENTS FOR NOISE REDUCTION

Suggested Structural Improvement

Title 25, Section 1092, of the California Administrative Code specifies, in substance, that the interior community noise equivalent level (CNEL) in specified dwellings attributable to exterior noise shall not exceed 45 dB, and that an acoustical analysis of such dwellings shall be provided by a proponent in areas in which the exterior CNEL exceeds 60 dB.

Architects in general are sufficiently well-informed to provide adequate means for noise reduction from the exterior to the interior, especially for dwellings and other buildings that are to be placed in an area of significant exterior noise impact. Also, the California State Department of Housing and Community Development has been preparing a booklet on the specifics of sound insulation which should be of assistance to builders and building officials alike.

There remains, however, a need for qualitative information on typical practicable structural improvements which afford effective and economically bearable noise reduction from the exterior to the interior in new structures located in areas where the total exterior CNEL ranges approximately from 60 to 70 dB.

The following structural improvements are suggested:

1. Slab foundations, to preclude appreciable noise leakage into the ground floor from underneath.
2. No sliding doors on the side of a building that faces the principal source of noise. Sliding doors along the "noise-shadow" side and the sides of the building at approximately right angles to the principal noise source are generally acceptable, provided that they are sealed when closed.

3. Windows facing the principal noise source shall be equipped with special glass panes of a nature consistent with the noise exposure, if necessary. Windows facing in other directions may be made of ordinary glass, but their frames and openable panels shall be sealed when closed, as in all noise-exposed windows.
4. There shall be no jalousie-type windows.
5. Use of staggered studs, cavity-fill-type insulation, and thicker-than-one-half-inch sheetrock or stucco, shall be considered primarily for walls and roof-ceiling panels facing the principal noise source and only secondarily for walls siding at approximately 90 degrees to the principal noise source and for walls in the noise shadow.
6. Workmanship of exterior walls, ceilings, doors, and openable windows and glass doors shall be such as to avoid cracks and other openings. This may require caulking, for example, when overlaps of structural elements are not sufficient to close a noise-flanking path.
7. Fireplace flues, if any, shall be equipped with a tightly closing damper.
8. There shall be no direct openings from the exterior to the interior, such as mail slots or ordinary attic vents on the wall or roof facing in the direction of the principal noise source.
9. No metal pipes (for example, water pipes or other utility conduits) shall pass through an exterior wall or roof facing in the direction of the principal noise source.
10. There shall be no back-to-back metal boxes (for example, electrical outlet or fuse boxes) in exterior walls facing the principal noise source.

11. All air ducts, connectors, and elbows shall contain an interior lining of fiberglass insulation at least one-half inch thick and at least five feet in length (or other acoustic treatment equivalent in duct-noise reduction) just prior to any room delivery vent or exhaust vent. Where total duct length is less than five feet, fiberglass lining of the entire duct length is deemed to be sufficient.
12. All ceiling and exhaust ducts in rooms having a wall or roof that faces the principal noise source shall be provided with a bend in the duct so that there is no direct line of sight through the duct from the venting cross-section to the room-opening cross-section.
13. Each dwelling discussed herein shall be equipped with a manually operated switch to actuate the blower of the central ventilating system, to provide a complete hourly air change at least equal to that required by the Uniform Building Code for rooms other than bathrooms, whenever a resident wishes to obtain interior ventilation with the windows closed, and wherever it cannot be shown, to the satisfaction of the City Building Official, that the prevailing wind, captured by an air intake, is adequate to provide the said air change without added blowing. It should be noted that the maximum noise level in interior dwelling spaces, created by the said central ventilating, must not exceed 40 dBA at the center of each respective room.
14. Allowance should be made for internal noise attenuation afforded by carpeting and furnishings in determining the exterior-to-interior noise reduction required. Wall-to-wall carpeting adds approximately 1 dB, and drapes and ordinary bedroom and living quarter furnishings can increase internal noise attenuation from 1 to 3 dB.

The aforescribed improvements require specific quantitative evaluation which varies from project to project. The suggested list of improvements offers qualitative guidance only and does not substitute adequately for a quantitative analysis or evaluation.

Verification of the Adequacy of the Exterior-to-Interior Noise Insulation

For the purpose of verifying whether noise insulation provided in a building is adequate, it may be deemed that the difference between the exterior CNEL and the interior CNEL actually achieved by a given structure may be approximated by the difference between maximum exterior A-weighted sound levels and simultaneously measured maximum interior A-weighted sound levels. Hence, there is no need to make long-term recordings of the exterior and interior CNEL's, but only a simultaneous recording of the maximum exterior and interior levels observed during a reasonable number of prominent noise events, for example, twenty to fifty noise events typified by aircraft fly-overs or fly-bys, train passages, pass-bys of trucks, or the like.

Two microphones of comparable characteristics are employed, one at the exterior and one in the interior of the building. The interior microphone should be located approximately five feet above the respective floor level for the story of the building to be noise-measured, when the noise events to be evaluated pertain to surface traffic. The exterior microphone should be located at least twenty feet above the local ground level or at least ten feet above neighboring roof tops, whichever is higher, when the noise events to be evaluated pertain to aircraft flight noise.

If the exterior and interior noises are to be first recorded on a professional-quality stereo tape recorder, for subsequent evaluation by a single precision sound-level meter, the calibration tone produced by a single calibrator shall be recorded on each of the two stereo tape recordings (one after the other, of course), so that proof of identical calibration on the two tracks of the tape is made part of the record.

The differences between the exterior and the interior A-weighted levels obtained during each of the noise events evaluated by this method shall be averaged by the following formula:

$$\text{Average noise-level reduction} = 10 \log \frac{1}{N} \left(\text{Sum of antilogs of } \frac{L_{A \max}}{10} \right)$$

where N is the number of noise events evaluated and $\frac{L_{A \max}}{10}$ is the difference in dB(A) between A-level outside and the maximum A-level inside during each respective noise event.

The noise-level reduction thus obtained is subtracted from the total exterior CNEL, and the adequacy of the interior CNEL obtained by that subtraction shall be evaluated in the light of Section 1092 of Title 25 of the California Administrative Code.

NOISE CRITERIA FOR LAND USE PLANNING

INTRODUCTION

In general, most of the land within the City of Alameda that is used or planned for residential use is adequately separated from unabatable sources of excessive noise. Also, areas subject to excessive, unabatable noise generally are occupied by noise-insensitive land uses. However, there are areas within the City where noise levels are incompatible with certain urban land uses. In some cases, the noise is unavoidable, irremovable and unabatable within reasonable expectation. Therefore, "noisy" areas exist within the City and will continue to exist in the foreseeable future. For this reason, it is necessary for the City to guide future development in a manner that is compatible with anticipated noise exposure.

The concept of noise-land use compatibility should take into account the opportunities of noise sources to reduce noise. Any noise source which affects other property to the extent that it limits the use of that property is indirectly imposing land use restrictions on that property. Therefore, each noise source should accept the responsibility of taking all reasonable and feasible steps to reduce noise and/or apply mitigating measures such as shielding.

There is one vexing problem that could result from an across the board application of the land use standards suggested by the State Guidelines for noise elements. If there is little or no probability that anyone could develop property with a noise compatible use, now or in the foreseeable future, establishing a noise compatible land use requirement might have the effect of imposing a noise easement on property without just compensation. Difficult questions arise where no noise compatible land use is feasible. Does the City become liable for someone else's noise? Do the City's actions trigger the liability of the noise maker (possibly at an earlier date than without the City's action)? Are the City and the noise-maker jointly liable? Does the landowner suffer the regulation without recourse?

No one can be sure of the answer at this time. Noise elements are a relatively new requirement in the State's planning law. These questions suggest even further that a comprehensive approach be followed.

This section deals with compatibility of land uses from the point of view of the level of noise experienced by the recipient. The approach used is to recommend maximum noise levels which would be compatible with various categories of land use.

COMPATIBLE LAND USE

An obvious purpose of including a noise element in a general plan is to achieve noise compatible land uses when new development occurs. Unfortunately, no legislative or regulatory definition of compatible land use has been stated. The nearest equivalents to a definition are found in Title 4 and the Land Use Compatibility Chart in the Noise Element Guidelines. This chart had its genesis in EPA studies and has been used by EPA, HUD, FAA and others. In modified form, the chart is reproduced herein.

In a community as highly developed as Alameda and surrounded by facilities that produce noise, a more comprehensive approach to compatible land use is required than that set out by the Compatibility Chart. The degree to which the burden of compatible land use must fall on the source compared to the land owner is relevant to the decision of land use. The relative burden of compatible use can be used to determine the extent to which a particular interest should carry the burden. For example, where a compatible land use is very feasible, the burden on the noise source of meeting mitigation requirements necessary to reduce noise to a compatible level probably would be very light. Conversely, where mitigating measures are cost effective for the noise source, the burden of a change of zoning to a less feasible use will usually be greater on the landowner than the burden on the noise source of affecting the mitigating measures. When neither mitigating

measures nor compatible land uses are feasible, acquisition of the lands impacted by the noise source or curtailment of the source are the only rational steps available. It is not appropriate to use City taxpayers' money to acquire lands that are impacted by noise generated by sources outside the City, or by activities unrelated to municipal functions.

Land Use Compatability for Community Noise Environments

| LAND USE CATEGORY | COMMUNITY NOISE EXPOSURE L_{dn} OR CNEL, dB | | | | | |
|---|--|----|----|----|----|----|
| | 55 | 60 | 65 | 70 | 75 | 80 |
| RESIDENTIAL - LOW DENSITY SINGLE FAMILY, DUPLEX, MOBILE HOMES | | | | | | |
| RESIDENTIAL - MULTI. FAMILY | | | | | | |
| TRANSIENT LODGING - MOTELS, HOTELS | | | | | | |
| SCHOOLS, LIBRARIES, CHURCHES, HOSPITALS, NURSING HOMES | | | | | | |
| AUDITORIUMS, CONCERT HALLS, AMPHITHEATRES | | | | | | |
| SPORTS ARENA, OUTDOOR SPECTATOR SPORTS | | | | | | |
| PLAYGROUNDS, NEIGHBORHOOD PARKS | | | | | | |
| GOLF COURSES, RIDING STABLES, WATER RECREATION, CEMETERIES | | | | | | |
| OFFICE BUILDINGS, BUSINESS COMMERCIAL AND PROFESSIONAL | | | | | | |
| INDUSTRIAL, MANUFACTURING UTILITIES, AGRICULTURE | | | | | | |

| LEGEND | | | |
|--------------------------|--|-----------------------|--|
| NORMALLY ACCEPTABLE | | NORMALLY UNACCEPTABLE | |
| CONDITIONALLY ACCEPTABLE | | CLEARLY UNACCEPTABLE | |

N.B.: The landuse-noise compatibility recommendations should be viewed in relation to the specific source of the noise. For example, aircraft and railroad noise is normally made up of higher single noise events than auto traffic but occurs less frequently. Therefore, different sources yielding the same composite noise exposure do not necessarily create the same noise environment. The State Aeronautics Act uses 65 dB CNEL as the criterion which airports must eventually meet to protect existing residential communities from unacceptable exposure to aircraft noise. In order to facilitate the purposes of the Act, one of which is to encourage land uses compatible with the 65 dB CNEL criterion wherever possible, and in order to facilitate the ability of airports to comply with the Act, residential uses located in Community Noise Exposure Areas greater than 65 dB should be discouraged and considered located within normally unacceptable areas.

The accompanying Land Use Compatibility Chart, based upon a similar chart included in the Technical Supplement to Noise Element Guidelines, prepared by the California Office of Noise Control, February, 1976, is used as the basis for noise-land use compatibility in Alameda. The range of acceptability of land uses within various community noise environment levels (CNEL) shall be interpreted for the City of Alameda in the following manner:

- NORMALLY ACCEPTABLE: Specified land use is satisfactory, assuming buildings are of conventional construction without special noise insulation.
- CONDITIONALLY ACCEPTABLE: Detailed analysis shall be required for all construction and noise insulation features shall be included in building design. Generally, conventional construction will suffice, but with closed windows and fresh air supply systems or air conditioning. This requirement shall be applied, irrespective of any projected decrease in CNEL for the area. Where the CNEL is 65 dB or greater, residential and commercial uses which give emphasis to outdoor activity should be discouraged.
- NORMALLY UNACCEPTABLE: New construction or development should generally be discouraged. Emphasis should be given to reduction of noise at the source, transferring development rights, delaying development until noise reduction has been accomplished and other methods of precluding the effects of excessive noise. Normally Unacceptable uses should not be permitted unless it can be clearly demonstrated to the satisfaction of the City that no Normally or Conditionally Acceptable use and/or site is feasible¹ and available. Should development and construction proceed, a detailed analysis of the noise reduction must be made and needed noise insulation features included in the design.

¹ Noise compatible land use is not feasible when there is little or no probability that property could be developed with a noise compatible use within the foreseeable future. This difficult question, which raises questions often litigated in either inverse condemnation or unreasonable and arbitrary zoning actions, could best be decided by a Superior Court action for declaratory relief.

- CLEARLY UNACCEPTABLE: New construction or development should generally not be permitted.
- AIRCRAFT NOISE: Where the CNEL is generated principally by aircraft noise the standards for normally unacceptable residential uses shall apply in areas which exceed 65 dB. For purposes of Ordinance No. 1750 N.S., areas located within 60 dB generated principally by aircraft noise shall be treated as impacted by 65 dB for the application of sound attenuation measures.

In all cases above, other than the Normally Acceptable category, particular attention should be given to the siting and exterior design of buildings in order to provide minimum exposure to and maximum shielding from noise.

When an acousitcal analysis is required, the following table of standards shall be applied to determine the extent of noise insulation for noise-level compatibility.

ALLOWABLE MAXIMUM INTERIOR NOISE LEVEL¹

| <u>Use</u> | <u>Interior Equivalent Energy Level (Leq)</u> |
|--|---|
| All residential, including permanent and transient | As required by City Ordinance No. 1750 N.S. |
| School classrooms | 50 dB |
| School auditoriums; legitimate theatre | 35 dB |
| Libraries; recreation buildings | 55 dB |
| Church sanctuaries; movie theatres | 40 dB |
| Concert halls | 25 dB |
| Industrial | 55 dB ² |
| Commercial | 50 dB ² |

1 Standards provided by Dr. Maurice Garbell.

2 In areas where people work continuously on tasks not related to noisier interior activities.

COMMUNITY NOISE ENVIRONMENTS MAP

The Community Noise Environments Map is to be used with the Land Use Compatibility Chart and the related interpretive description to guide noise compatible land use planning in Alameda. The Chart indicates the range of acceptability of various types of land use in relation to levels of noise exposure. The map shows those areas in the City that are Normally Acceptable, Conditionally Acceptable, Normally Unacceptable, and Clearly Unacceptable for noise-sensitive land uses. The noise sensitive uses are residential (including transient lodging), schools, libraries, churches, hospitals and nursing homes. Although the map is oriented to noise-sensitive land use, it also should be used to determine compatible noise environments for the other land uses listed in the Chart. The Community Noise Environment Map shall also be used to determine High Exposure Areas for application of Ordinance No. 1750 N.S., the City of Alameda's Noise Insulation Ordinance. High Exposure Areas are areas where the total community noise equivalent level (the CNEL of all sources) attains or exceeds 65 dB.

The community noise environments, delineated on the map, represent a composite of CNELs from all sources. Surface noise and Naval Air Station noise were taken from the M.A.G. maps. Oakland Airport noise levels are based on the Wyle Case C except that the 70 dB contour closest to Runway 29 was adjusted to follow the general alignment of Catalina Avenue¹ and the 65 dB contour was adjusted to follow a segment of Mecartney Road to the end of present development.²

In drafting the Community Noise Environments map it was noted that there were discrepancies between the U.S.G.S. map, used as a base for the Wyle contours, and the City of Alameda base map which was used for the M.A.G. maps and the

1 See Discussion of Title 4, pp. 34-35.

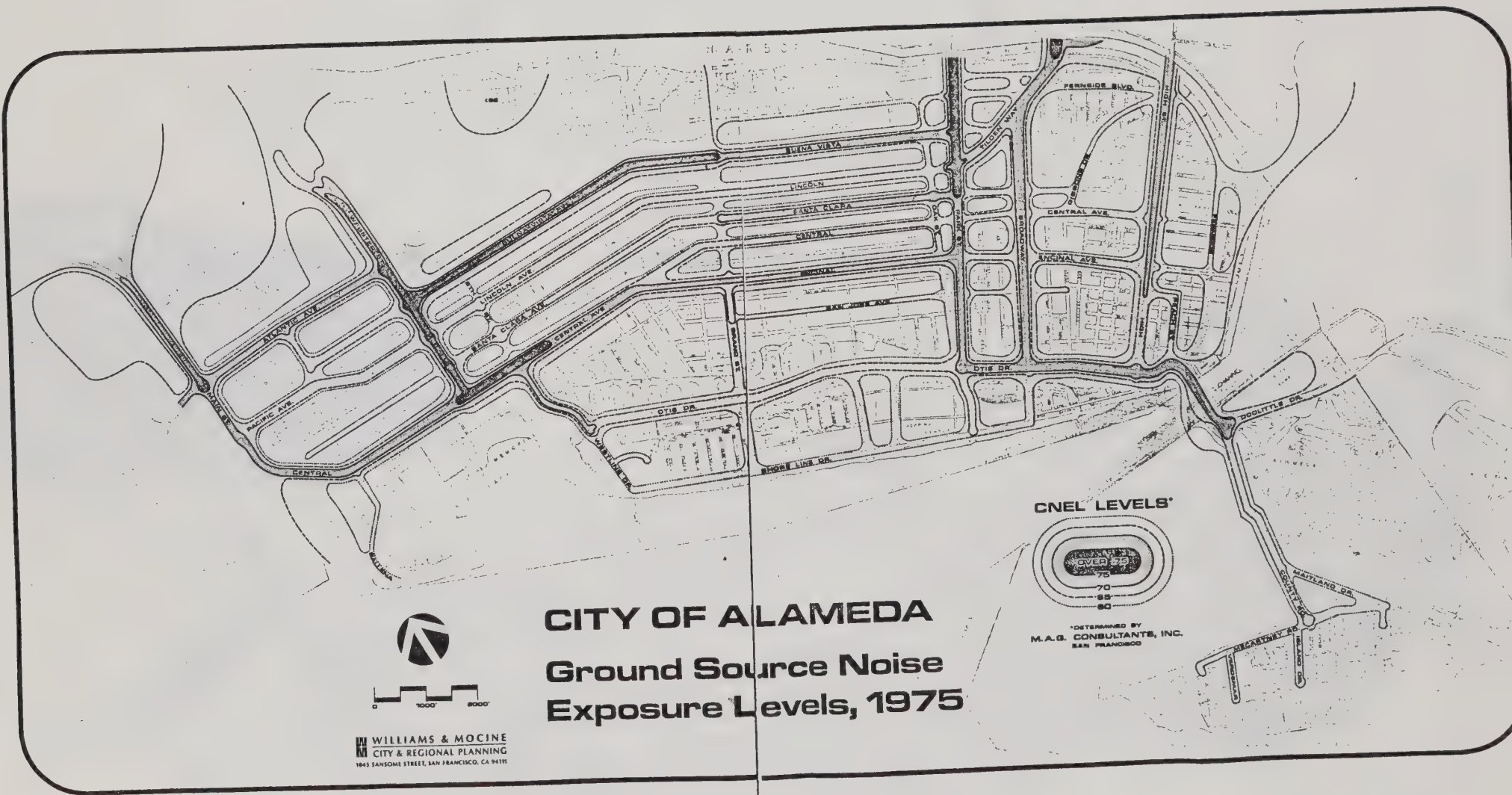
2 This adjustment was desirable to remove the curvature, which in addition to the map distortions would make the line difficult to locate on the ground. A definite location was picked on Mecartney Road which would retain the integrity of uses in the immediate vicinity of the line along Mecartney.

Noise Environments map. Additionally, the reproduction process may cause map distortion. Furthermore, calculated noise contours are not finite lines.¹

This presents a problem in the administration of the Noise Element and related ordinances which require a definite location for 60, 65, 70 and 75 dB contours. For this reason, the following observations are made:

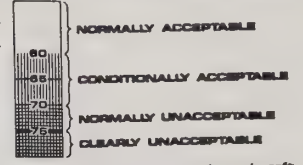
- The contour lines illustrated in this report should be considered as conservative, in the sense that noise may be less than shown on the map but not greater than shown. Monitoring data on page 19, herein, and conclusions in Chapter 5 of the Wyle Report support this premise.
- The U.S.G.S. map is considered to be a more reliable base than the City map, and should be used where greater accuracy is deemed important.
- The Community Noise Environments map shall be accepted as the authoritative reference for Community Noise Equivalent Levels in the City of Alameda.

¹ See page 7.



Page 2

ACCEPTABILITY FOR NOISE-SENSITIVE LAND USES



Boundary of area where aircraft-generated CNEL exceeds 65 dBA. (See page 66.)

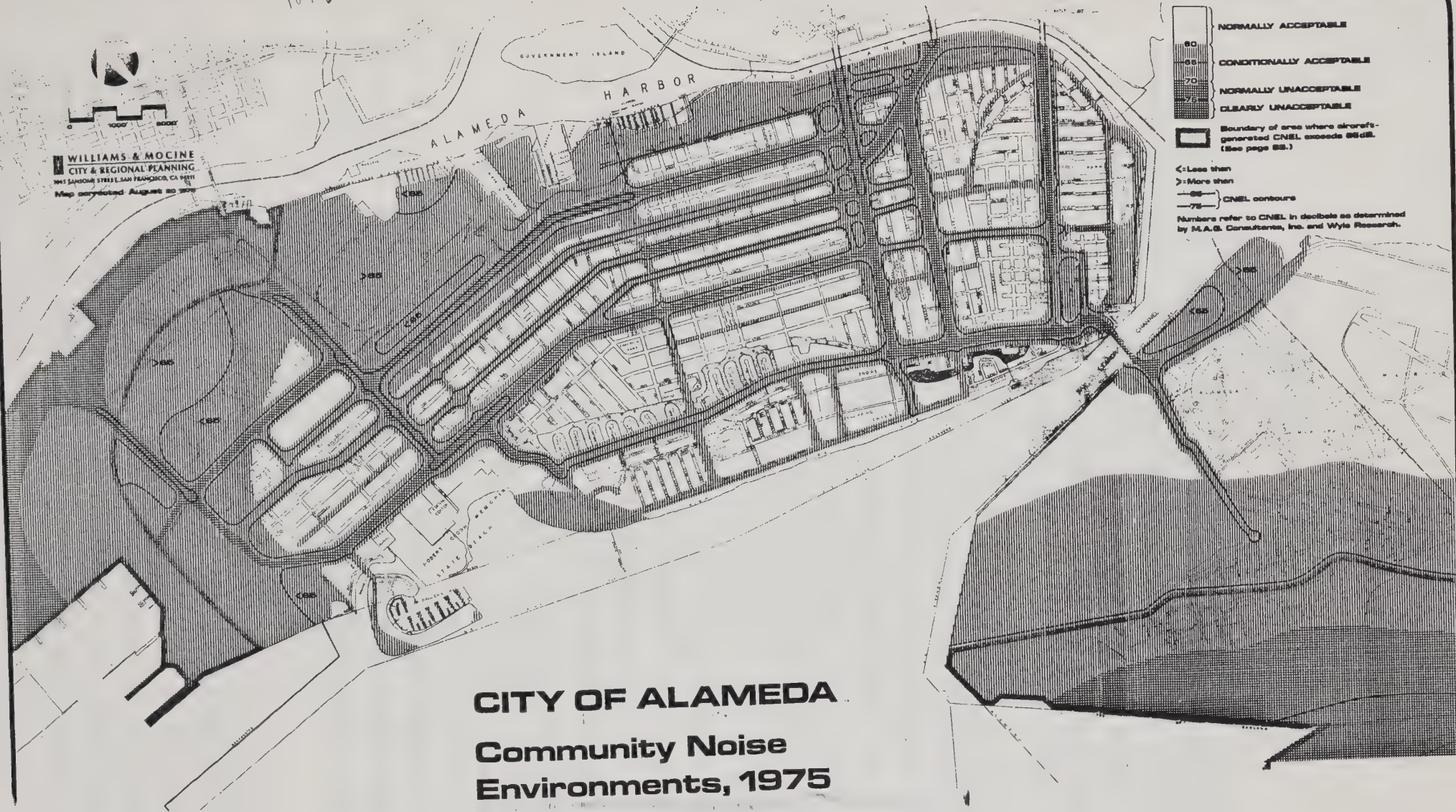
<: Less than
>: More than

— CNEL contours

Numbers refer to CNEL in decibels as determined by M.A.S. Consultants, Inc. and Wyle Research.



WILLIAMS & MOCINE
CITY & REGIONAL PLANNING
3045 SAKOMA STREET, SAN FRANCISCO, CA 94111
Map completed August 20, 1975



CITY OF ALAMEDA
Community Noise
Environments, 1975

RELATIONSHIP WITH COMPREHENSIVE PLANNING

It was shown in a previous section on "Future Noise" that the population of the City in 1995 will be subject to less noise than the current population. This should not suggest that the City government become passive and complacent on the subject. There still remains the problem of dealing with noise in the short-term future. This requires directing growth toward the more quiet areas while waiting for noise reducing events to reduce noise in the noisier areas.

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The Circulation Element should take into account the relationship between noise and traffic volumes. For example, a street with an average daily traffic volume of 36,000 vehicles will project a CNEL contour of 65 dB approximately 160 feet from the center of the outer lane; 20,000 vehicles will project 65 dB nearly 115 feet. This makes a case for extraordinarily wide rights-of-way for busy streets, barriers or other noise mitigation measures being incorporated in traffic planning.

The Circulation Element currently is being revised to incorporate circulation plans for Bay Farm Island and other changes in the City's street pattern. When the Circulation Element is adopted, the Noise Element should be examined for possible changes in the CNEL generated by new traffic patterns. The methodology to be used is referenced herein under "Future Surface Noise."

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The ALUC Plan was ruled inadequate by the Superior Court and no plan currently exists. The Alameda Noise Element should be reviewed by the ALUC and should serve as a vehicle for the City's participation in the formulation of the ALUC Plan.

RELATIONSHIP OF THE NOISE ELEMENT TO THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

Section 15148 of California Administrative Code, Title 14, Division 6 states:

The requirements for an EIR on a local general plan, element or amendment thereof will be satisfied by the general plan or element document, and no separate EIR will be required, if: (1) the general plan addresses all the points required to be in an EIR by Article 9 of these Guidelines and (2) the document contains a special section or a cover sheet identifying where the general plan document addresses each of the points required.

This section of the Noise Element, in compliance with Section 15148, will discuss the points required by Article 9 of the CEQA Guidelines, or will indicate sections in the Noise Element in which the points are addressed.

1. Description of the Project:
 - a. Location: See City of Alameda map, page 13 ; also Regional Map, page 13 .
 - b. Statement of Objectives: See Purpose, pages 4, 5 and Goals, pages 46-49 .
 - c. Project Characteristics: Principal proposals of the Noise Element are described under "Goals and Policies," pages 46 to 49.
2. Description of Environmental Setting: The noise environment is described in the Noise in Alameda section, pages 12 to 28 and maps within that section. The noise environment is summarized on the Community Noise Environments map, page 91. Related projects are described in the section on "Relationship with Comprehensive Planning," pages 92 to 93.
3. Environmental Impact: The sections of Mitigating Measures for Noise control, pages 50 to 82 and Noise Criteria for Land Use Planning, pages 83 to 84 would, if implemented, have a slight adverse impact in the following respects:
 - a. Quieting the noise at the source may impose some costs on the noise generator; however, the primary measures to reduce noise at the source are Federal and State regulations, rather than the Alameda Noise Element.

- b. Removing the source of the noise would generate expenditures for relocation.
- c. Barring the path of the noise from its source to the recipient would result in minor alteration of the land form from the construction of barriers; public and private expenditures also would be required.
- d. Shielding the recipient of noise would result in increased construction costs where building insulation is required to satisfy required interior noise levels.
- e. Avoiding the placement of potential recipients of noise into the impact area of unavoidable, unabatable, irremovable noise may, through the application of Noise Criteria For Land Use Planning, pages 83 to 84 , influence the urban form of the City.
- f. Noise mitigation would require public expenditures to support the City staff required for implementation.
- g. No other adverse effects are anticipated

4. Unavoidable Adverse Effects:

- a. Public and private costs for barriers, insulation, relocation, improved aircraft operation and implementation of the Element by City staff.
- b. Land form alteration in construction of barriers.
- c. Effect on urban form and population distribution notwithstanding the above effects, the Noise Element should be implemented in order to improve the noise environment of the City of Alameda and the resulting benefits of increased health, safety and property values.

5. Mitigating Measures: The Noise Element is directed at the conservation and improvement of the noise environment of the City. The adverse effects of the Element are minor and no mitigation is proposed. The Element is directed at the mitigation of noise generated by activities discussed but not caused by the Element.

10. Water Quality Aspects: None

11. Organizations and Persons Consulted:

During the formulation of the Noise Element the following organizations and persons were consulted:

- . City of Alameda: City Manager, John D. Goss, City Engineer, Mark Hanna, Planning Director, Don E. Patterson, City Attorney, Carter Stroud
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- . San Francisco International Airport: James Hahne
- . Office of Noise Control - Berkeley: Jack Swing
- . Airlines: TIA - Mr. Soderblum, Mr. Dregler and Mr. McCalley, PAA - Capt. Mulholland, United - Capt. Maulsby and Capt. Cottle, Saturn - Mr. Tichack, PSA - Jim Snody, Western - Mr. Seavey
- . FAA: Charles Evans - OAK tower
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The Noise Element would not contribute noticeably to the consumption of energy. On the contrary, noise reducing measures proposed in the Element generally tend also to be effective in reducing the consumption of energy.

6. Alternatives to the Proposed Action: The "no project" alternative was not considered since the Noise Element is required by State law. Two other alternatives could be considered; either a higher or lower level of noise control. The proposed Noise Element does not propose significant public expenditures for noise control but nevertheless anticipates that the CNEL above 65 dB that effects 20 percent of the 1975 population, will effect only 3 percent by 1995. Therefore, a higher level of control, which would require additional cost, is felt to be unnecessary; a lower level of control, which would be less effective, is felt to be undesirable.
7. The Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity: There are no cumulative or long-term effects of the Noise Element which adversely affect the state of the environment. The range of beneficial uses of the environment would not be narrowed nor would long-term risks to health and safety be posed. The Noise Element should be adopted because it is an element of the general plan which is required by State law and, additionally, would have a beneficial effect upon the noise environment of the City of Alameda.
8. Any Irreversible Environmental Changes Which Would Be Involved in the Proposed Action Should It Be Implemented: Some changes in the urban form of the City may be influenced, if not caused, by the Noise Element. See pages 92 to 93 "Relationship with Comprehensive Planning."
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CLEARLY UNACCEPTABLE: New construction or development should generally not be permitted.

AIRCRAFT NOISE: Where the CNEL is generated principally by aircraft noise the standards for normally unacceptable residential uses shall apply in areas which exceed 65 dB, unless, with respect to the area between 65 and 70 dB CNEL, the area is subject to an easement which protects the airport from lawsuits based on aircraft noise. For purposes of Ordinance No. 1750 N.S., areas located within 60 dB generated principally by aircraft noise shall be treated as impacted by 65 dB for the application of sound attenuation measures.

In all cases above, other than the Normally Acceptable category, particular attention should be given to the siting and exterior design of buildings in order to provide minimum exposure to and maximum shielding from noise.

NOISE EASEMENTS: Where normally unacceptable areas are treated as conditionally acceptable areas because of the existence of noise easements, dwelling units must incorporate design features and special construction to meet the following specifications:

1. The reduction from exterior noise levels to interior noise levels in all habitable rooms attributable to exterior aircraft noise events shall attain at least the following:
 - a. 30 dB in the easement area north (that is, on the "land side") of the "70 dB CNEL contour" appearing in the noise element of the City of Alameda (1975).
 - b. 32 dB in the easement area south (that is, on the "Bay side") of the "70 dB CNEL contour" appearing in the noise element of the City of Alameda (1975).
2. In addition to said reductions, the interior noise levels in all habitable rooms attributable to exterior aircraft noise events shall not exceed a measured average CNEL value of 40 dB.

3. Evidence of compliance with the standards set forth above shall consist of submittal of an acoustical analysis report in accordance with the provisions of Alameda Municipal Code Sec. 10-1061 (Ordinance No. 1750 N.S.).
4. Prospective purchasers or tenants of such residential property shall be informed of noise levels expected to occur at the site in plain terms which relate these noise levels to their potential impact on both indoor and outdoor activities. Such notice shall be included in the CC&R's for any approved development.

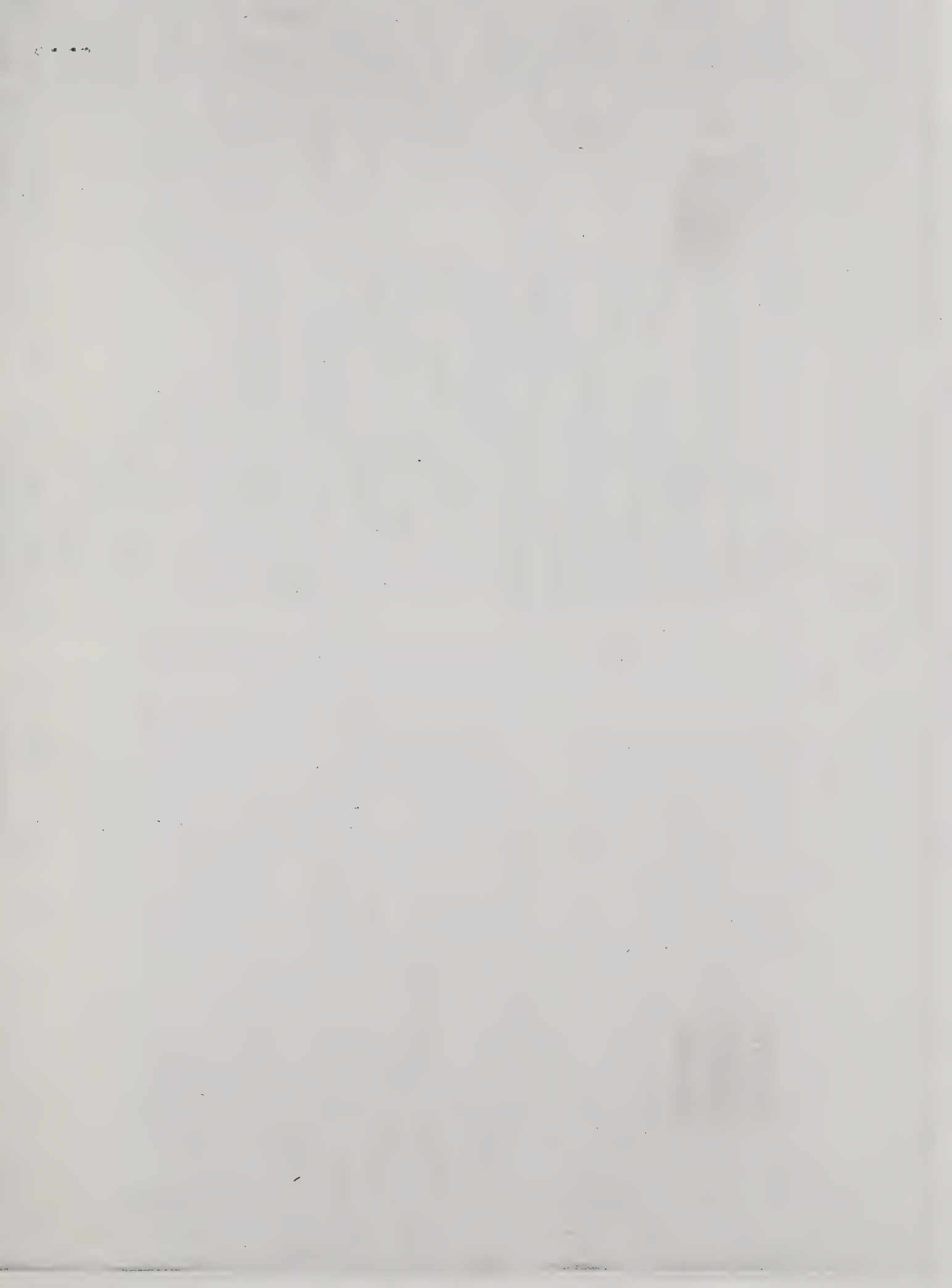
When an acoustical analysis is required, the following table of standards shall be applied to determine the extent of noise insulation for noise-level compatibility.

ALLOWABLE MAXIMUM INTERIOR NOISE LEVEL¹

| <u>Use</u> | <u>Interior Equivalent Energy Level (Leq)</u> |
|--|---|
| All residential, including permanent and transient | As required by City Ordinance No. 1750 N.S. |
| School classrooms | 50 dB |
| School auditoriums; legitimate theatre | 35 dB |
| Libraries; recreation buildings | 55 dB |
| Church sanctuaries; movie theaters | 40 dB |
| Concert halls | 25 dB |
| Industrial | 55 dB ² |
| Commercial | 50 dB ² |

1 Standards provided by Dr. Maurice Garbell.

2 In areas where people work continuously on tasks not related to noisier interior activities.



Land Use Compatability for Community Noise Environments

| LAND USE CATEGORY | COMMUNITY NOISE EXPOSURE L _{dn} OR CNEL, dB | | | | | |
|---|---|----|----|----|----|----|
| | 55 | 60 | 65 | 70 | 75 | 80 |
| RESIDENTIAL - LOW DENSITY SINGLE FAMILY, DUPLEX, MOBILE HOMES | | | | | | |
| RESIDENTIAL - MULTI. FAMILY | | | | | | |
| TRANSIENT LODGING - MOTELS, HOTELS | | | | | | |
| SCHOOLS, LIBRARIES, CHURCHES, HOSPITALS, NURSING HOMES | | | | | | |
| AUDITORIUMS, CONCERT HALLS, AMPHITHEATRES | | | | | | |
| SPORTS ARENA, OUTDOOR SPECTATOR SPORTS | | | | | | |
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| LEGEND | | | |
|--------------------------|--|-----------------------|--|
| NORMALLY ACCEPTABLE | | NORMALLY UNACCEPTABLE | |
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N.B.: The landuse-noise compatability recommendations should be viewed in relation to the specific source of the noise. For example, aircraft and railroad noise is normally made up of higher single noise events than auto traffic but occurs less frequently. Therefore, different sources yielding the same composite noise exposure do not necessarily create the same noise environment. The State Aeronautics Act uses 65 dB CNEL as the criterion which airports must eventually meet to protect existing residential communities from unacceptable exposure to aircraft noise. In order to facilitate the purposes of the Act, one of which is to encourage land uses compatible with the 65 dB CNEL criterion wherever possible, and in order to facilitate the ability of airports to comply with the Act, residential uses located in Community Noise Exposure Areas greater than 65 dB should be discouraged and considered located within normally unacceptable areas, unless, with respect to the area between 65 and 70 dB CNEL, the area is subject to an easement which protects the airport from lawsuits based on aircraft noise.

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With respect to the area between 65 & 70 dB CNEL, the area is subject to an easement which protects the airport. The land use is based on a flight pattern.

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| Concert halls | 25 dB |
| Industrial | 55 dB ² |
| Commercial | 50 dB ² |

1 Standards provided by Dr. Maurice Garbell.

2 In areas where people work continuously on tasks not related to noisier interior activities.

COMMUNITY NOISE ENVIRONMENTS MAP

The Community Noise Environments Map is to be used with the Land Use Compatibility Chart and the related interpretive description to guide noise compatible land use planning in Alameda. The Chart indicates the range of acceptability of various types of land use in relation to levels of noise exposure. The map shows those areas in the City that are Normally Acceptable, Conditionally Acceptable, Normally Unacceptable, and Clearly Unacceptable for noise-sensitive land uses. The noise sensitive uses are residential (including transient lodging), schools, libraries, churches, hospitals and nursing homes. Although the map is oriented to noise-sensitive land uses, it also should be used to determine compatible noise environments for the other land uses listed in the Chart. The Community Noise Environment Map shall also be used to determine High Exposure Areas for application of Ordinance No. 1750 N.S., the City of Alameda's Noise Insulation Ordinance. High Exposure Areas are areas where the total community noise equivalent level (the CNEL of all sources) attains or exceeds 65 dB.

The community noise environments, delineated on the map, represent a composite of CNELs from all sources. Surface noise and Naval Air Station noise were taken from the M.A.G. maps. Oakland Airport noise levels are based on the Wyle Case C except that the 70 dB contour closest to Runway 29 was adjusted to follow the general alignment of Catalina Avenue¹ and the 65 dB contour was adjusted to follow a segment of Mecartney Road to the end of present development.²

1 See Discussion of Title 4, pp. 34-35.

2 This adjustment was desirable to remove the curvature, which in addition to the map distortions would make the line difficult to locate on the ground. A definite location was picked on Mecartney Road which would retain the integrity of uses in the immediate vicinity of the line along Mecartney.

In drafting the Community Noise Environments map it was noted that there were discrepancies between the U.S.G.S. map, used as a base for the Wyle contours, and the City of Alameda base map which was used for the M.A.G. maps and the Noise Environments map. Additionally, the reproduction process may cause map distortion. Furthermore, calculated noise contours are not finite lines.¹

This presents a problem in the administration of the Noise Element and related ordinances which require a definite location for 60, 65, 70 and 75 dB contours. For this reason, the following observations are made:

- The contour lines illustrated in this report should be considered as conservative, in the sense that noise may be less than shown on the map but not greater than shown. Monitoring data on page 19, herein, and conclusions in Chapter 5 of the Wyle Report support this premise.

- The U.S.G.S. map is considered to be a more reliable base than the City map, and should be used where greater accuracy is deemed important.

- The Community Noise Environments map shall be accepted as the authoritative reference for Community Noise Equivalent Levels in the City of Alameda.

1 See page 7.
Rev. 3/13/79

RELATIONSHIP WITH COMPREHENSIVE PLANNING

It was shown in a previous section on "Future Noise" that the population of the City in 1995 will be subject to less noise than the current population. This should not suggest that the City government become passive and complacent on the subject. There still remains the problem of dealing with noise in the short-term future. This requires directing growth toward the more quiet areas while waiting for noise reducing events to reduce noise in the noisier areas.

Although the Comprehensive Plan is, by its nature, long-range it should take into account the desirability of staging growth in a reasonable manner. Therefore, the Land Use Element of the Plan should take the conservative approach of assuming that current levels of noise will remain until lower levels can be demonstrated. Bay Farm Island is a case in point. In the Noise Element it is assumed that about half of the population growth in Alameda to 1995 will occur on Bay Farm Island. It also is assumed that the CNEL contours from Oakland Airport will be reduced over the years. It should also be noted that the 65 dB CNEL line is a flexible one and may be modified as the noise environment changes. Accordingly, certain types of development, such as residential, would not be precluded from an area which currently is subject to noise levels higher than 65 CNEL if in the future noise levels are reduced. Similar logic should apply to other portions of the City as well, except that where the CNEL is dominated by surface noise, 70 dB would be the upper limit of acceptability rather than 65 dB.

The Circulation Element should take into account the relationship between noise and traffic volumes. For example, a street with an average daily traffic volume of 36,000 vehicles will project a CNEL contour of 65 dB approximately 160 feet from the center of the outer lane; 20,000 vehicles will project 65 dB nearly 115 feet. This makes a case for extraordinarily wide rights-of-way for busy streets, barriers or other noise mitigation measures being incorporated in traffic planning.

The Circulation Element currently is being revised to incorporate circulation plans for Bay Farm Island and other changes in the City's street pattern. When the Circulation Element is adopted, the Noise Element should be examined for possible changes in the CNEL generated by new traffic patterns. The methodology to be used is referenced herein under "Future Surface Noise."

The zoning ordinance also should take into account the effects of noise. It would be appropriate to incorporate the concept of noise compatible land use within the ordinance as a basic requirement. Additionally, the zoning ordinance could require appropriate setbacks and building orientation to provide minimum noise exposure.

The City's subdivision ordinance should have a role in implementing the Noise Element. The noise compatibility of the uses proposed by a subdivision should be a basic factor in considering approval of a proposed subdivision. In some cases, deep lots to permit large setbacks may be required to preclude noise problems. Subdivisions which anticipate clustering of buildings may be appropriate.

The Noise Element also should be coordinated with the Airport Land Use Commission (ALUC) Plan. The ALUC Plan originally consisted of a line on Bay Farm Island generally parallel to Oakland Airport Runway 29 and along the general alignment of Mecartney Road. The intent of the line was to provide a boundary to preclude additional residential development southerly of the line, towards the extended path of Runway 29.

The ALUC Plan was ruled inadequate by the Superior Court and no plan currently exists. The Alameda Noise Element should be reviewed by the ALUC and should serve as a vehicle for the City's participation in the formulation of the ALUC Plan.

RELATIONSHIP OF THE NOISE ELEMENT TO THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

Section 15148 of California Administrative Code, Title 14, Division 6 states:

The requirements for an EIR on a local general plan, element or amendment thereof will be satisfied by the general plan or element document, and no separate EIR will be required, if: (1) the general plan addresses all the points required to be in an EIR by Article 9 of these Guidelines and (2) the document contains a special section or a cover sheet identifying where the general plan document addresses each of the points required.

This section of the Noise Element, in compliance with Section 15148, will discuss the points required by Article 9 of the CEQA Guidelines, or will indicate sections in the Noise Element in which the points are addressed.

1. Description of the Project:

- a. Location: See City of Alameda map, page 13 ; also Regional Map, page 13 .
- b. Statement of Objectives: See Purpose, pages 4, 5 and Goals, pages 46-49 .
- c. Project Characteristics: Principal proposals of the Noise Element are described under "Goals and Policies," pages 46 to 49.

2. Description of Environmental Setting: The noise environment is described in the Noise in Alameda section, pages 12 to 28 and maps within that section. The noise environment is summarized on the Community Noise Environments map, page 91. Related projects are described in the section on "Relationship with Comprehensive Planning," pages 92 to 93.

- ### 3. Environmental Impact: The sections of Mitigating Measures for Noise control, pages 50 to 82 and Noise Criteria for Land Use Planning, pages 83 to 84 would, if implemented, have a slight adverse impact in the following respects:
- a. Quieting the noise at the source may impose some costs on the noise generator; however, the primary measures to reduce noise at the source are Federal and State regulations, rather than the Alameda Noise Element.

The Noise Element would not contribute noticeably to the consumption of energy. On the contrary, noise reducing measures proposed in the Element generally tend also to be effective in reducing the consumption of energy.

6. Alternatives to the Proposed Action: The "no project" alternative was not considered since the Noise Element is required by State law. Two other alternatives could be considered; either a higher or lower level of noise control. The proposed Noise Element does not propose significant public expenditures for noise control but nevertheless anticipates that the CNEL above 65 dB that effects 20 percent of the 1975 population, will effect only 3 percent by 1995. Therefore, a higher level of control, which would require additional cost, is felt to be unnecessary; a lower level of control, which would be less effective, is felt to be undesirable.
7. The Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity: There are no cumulative or long-term effects of the Noise Element which adversely affect the state of the environment. The range of beneficial uses of the environment would not be narrowed nor would long-term risks to health and safety be posed. The Noise Element should be adopted because it is an element of the general plan which is required by State law and, additionally, would have a beneficial effect upon the noise environment of the City of Alameda.
8. Any Irreversible Environmental Changes Which Would Be Involved in the Proposed Action Should It Be Implemented: Some changes in the urban form of the City may be influenced, if not caused, by the Noise Element. See pages 92 to 93 "Relationship with Comprehensive Planning."
9. Growth-Inducing Impact of the Proposed Action: The Noise Element itself would not induce growth but would influence the quality of growth through application of "Noise Criteria for Land Use Planning," pages 83 to 84.

LIST OF CONTACT PERSONS WITH ADDRESS AND TELEPHONES

Advisory Council on Historic Preservation (ACHP):

Mr. Louis S. Wall, Chief
Advisory Council on Historic Preservation
Lake Plaza-South, Suite 616
44 Union Blvd.
Lakewood, Colo. 80228 (303)234-4946

Bay Conservation and Development Commission (BCDC):

30 Van Ness Ave., Room 2011
San Francisco, CA 94102 (415)557-3686

Federal Emergency Management (FEMA):

Mail address: FEMA NTH Division
211 Main Street, Suite 220
San Francisco, CA 94105

For Flood information (FIA maps) by telephone, call:

Mr. Dale Peterson, Community Planner
Brick Bldg. to the right of the
Ferry Bldg.
San Francisco, CA (415)556-9840

U.S. Fish and Wildlife Service (For info on Endangered Species)

in California: Mr. Ralph Swanson, Area Manager
U.S. Fish and Wildlife Service
1230 "N" Street
Sacramento, CA 95814

~~(916)440-2791~~
(916) 484-4731
4935

in Nevada until September 1982:

Mr. L. S. Nehrhoff, Area Manager
U.S. Fish and Wildlife Service
4620 Overland Road, Room 238
Boise, Idaho 83705

707-944-2011
(208)334-1960
Fish and Game
Yamhillville
Ted Wooster

(After September 1982 - Field Office will replace Boise Area Manager's Office. Address and telephone may change.)

Environmental Protection Agency (EPA):

215 Fremont Street
San Francisco, CA 94105

For Air Quality info in CA and NEV: Mr. Doug Grano
Chief SIP Section
(Mail Code A-2-3) (415)974-8058

For Aquifer info in CA: Mr. Nate Lau, (Mail Code W-3) (415)974-8274

For Aquifer info in NEV: Mr. Greg Chew, (Mail Code W-4-2) (415)974-8291

State Historic Preservation Officer (SHPO):

Dr. Knox Mellon
Dept. of Parks and Recreation
P.O. Box 2390
Sacramento, CA 95811 (916)322-8700

For telephone contacts, call Dr. Hans Kreutzberg, same address and phone.

Dr. Hans Kreutzberg - 556-6642

JULY 1, 1982

METALS

SOURCES OF SUPPLY: TREATED (FILTER PLANTS)

| Constituent * or Property | Reported as | Date | LAFAYETTE | ORINDA | SAN PABLO | SOBRANTE | UPPER SAN LEANDRO | WALNUT CREEK | |
|------------------------------|----------------|------|-----------|---------|-----------|----------|----------------------|-----------------|--|
| Aluminum | Al | 9/81 | 0.03 | 0.11 | 0.26 | 0.03 | 0.13 | 0.04 | |
| Arsenic | As | 9/81 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | |
| Barium | Ba | 9/81 | 0.007 | 0.011 | 0.014 | 0.018 | 0.034 | 0.011 | |
| Beryllium | Be | 9/81 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | |
| Cadmium | Cd | 9/81 | 0.0003 | 0.0003 | 0.0008 | 0.0005 | 0.0004 | 0.0002 | |
| Calcium | Ca | 9/81 | 8.8 | 9.1 | 15.6 | 15.0 | 26.4 | 8.8 | |
| Chromium | Cr | 9/81 | <0.002 | <0.002 | <0.002 | 0.003 | 0.002 | <0.002 | |
| Cobalt | Co | 9/81 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | |
| Copper | Cu | 9/81 | <0.003 | <0.003 | 0.014 | 0.017 | 0.006 | 0.004 | |
| Iron | Fe | 9/81 | <0.06 | <0.06 | <0.06 | 0.09 | <0.06 | <0.06 | |
| Lead | Pb | 9/81 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | |
| Lithium | Li | 9/81 | 0.001 | 0.001 | 0.003 | 0.002 | 0.006 | 0.001 | |
| Magnesium | Mg | 9/81 | 0.8 | 0.8 | 3.8 | 3.8 | 11.8 | 0.8 | |
| Manganese | Mn | 9/81 | 0.003 | 0.003 | 0.003 | 0.032 | 0.003 | 0.003 | |
| Mercury | Hg | 9/81 | 0.0001 | 0.0001 | 0.0003 | 0.0002 | 0.0003 | 0.0002 | |
| Molybdenum | Mo | 9/81 | <0.001 | 0.002 | 0.001 | 0.001 | 0.002 | 0.005 | |
| Nickel | Ni | 9/81 | 0.003 | 0.003 | 0.005 | 0.006 | 0.004 | 0.003 | |
| Potassium | K | 9/81 | 0.5 | 0.5 | 1.1 | 1.1 | 1.7 | 0.5 | |
| Selenium | Se | 9/81 | 0.006 | 0.002 | 0.001 | 0.003 | 0.007 | 0.003 | |
| Silver | Ag | 9/81 | <0.0001 | <0.0001 | 0.0002 | 0.0008 | 0.0001 | <0.0001 | |
| Sodium | Na | 9/81 | 1.7 | 1.7 | 8.3 | 14.7 | 25.2 | 1.6 | |
| Strontium | Sr | 9/81 | 0.04 | 0.05 | 0.10 | 0.12 | 0.26 | 0.04 | |
| Zinc | Zn | 9/81 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

* Conductivity in micromhos/cm; Other results, except pH are in mg/L

Chemical Analyses of Sources of Supply

from HUD.

Revised Edition
December 1981

POTENTIAL HAZARDOUS
WASTE PROPERTIES AND
BORDER ZONE PROPERTIES

1. ALAMEDA COUNTY

HWP BZP

| | | |
|---|---|---|
| Lawrence Livermore Laboratory -- Site 300 (Dept. of Energy) | X | X |
| Lawrence Livermore Laboratory -- Site 300 (U. C. Regents) | X | X |
| Lawrence Livermore National Laboratory | X | X |
| Oakland Scavenger Company, Altamont Landfill | X | X |

a. Berkeley

| | | |
|--|---|---|
| Colgate-Palmolive Company | X | X |
| National Starch and Chemical Corporation | X | X |

b. Fremont

| | | |
|--------------|---|---|
| Borden, Inc. | X | X |
|--------------|---|---|

c. Livermore

| | | |
|--|----|---|
| Lawrence Livermore National Laboratory | -- | X |
|--|----|---|

d. Newark

| | | |
|---|----|---|
| Baron-Blakeslee Division, Purex Corporation, Newark | X | X |
| Borden, Inc. | -- | X |
| Cerro Metal Products, California Works | X | X |
| FMC Corporation | X | X |
| Peterbilt Motors Company | X | X |

e. Oakland

| | | |
|---------------------|---|---|
| Oakland Power Plant | X | X |
|---------------------|---|---|

2. AMADOR COUNTY

| | | |
|---|---|---|
| American Forest Prod Corp (formerly Bendix Forest Products) | X | X |
|---|---|---|

| | <u>HWP</u> | <u>BZP</u> |
|--|------------|------------|
| 3. <u>COLUSA COUNTY</u> | | |
| Colusa County Landfill, Evans and Haun Road | X | X |
| Colusa County Landfill, Stonyford/Ladoga Road | X | X |
| 4. <u>CONTRA COSTA COUNTY</u> | | |
| Acme Fill Corporation | X | X |
| Avon Power Plant | X | X |
| Chevron Chemical Company, Richmond | -- | X |
| Contra Costa Power Plant | X | X |
| Dow Chemicals -- Pittsburg Plant | X | X |
| DuPont De Nemours and Company, Inc. | X | X |
| FMC Corporation, Agricultural Chemical Group, Richmond | -- | X |
| Imperial West Chemical Company | X | X |
| IT Corporation -- Baker & Vine Hill Facility | X | X |
| IT Transportation Corporation -- Northern California | X | X |
| Mare Island Sanitary Landfill | -- | X |
| Martinez Power Plant | X | X |
| Oleum Power Plant | X | X |
| Pittsburg Power Plant | -- | X |
| Shell Oil Company, Martinez Manufacturing Complex | X | X |
| Stauffer Chemical Company | -- | X |
| Tosco Corporation, Lion Oil Division -- Avon Refinery | X | X |
| United States Steel -- Pittsburg Works | X | X |
| Union Oil Company of California | X | X |
| West Contra Costa Sanitary Landfill | X | X |
| a. <u>Antioch</u> | | |
| Contra Costa Power Plant | -- | X |
| b. <u>Concord</u> | | |
| Tosco Corporation, Lion Oil Division -- Avon Refinery | -- | X |
| c. <u>Hercules</u> | | |
| Pacific Refining Company | X | X |
| d. <u>Martinez</u> | | |
| Martinez Power Plant | X | X |
| Shell Oil Company, Martinez Manufacturing Complex | X | X |
| Stauffer Chemical Company | X | X |

| | <u>HWP</u> | <u>BZP</u> |
|--|------------|------------|
| e. <u>Pittsburg</u> | | |
| Dow Chemical -- Pittsburg Plant | -- | X |
| Imperial West Chemical Company | -- | X |
| Pittsburg Power Plant | X | X |
| f. <u>Richmond</u> | | |
| Chevron Chemical Company, Richmond | X | X |
| Chevron U.S.A., Richmond Refinery | X | X |
| FMC Corporation Agricultural Chemical Group, Richmond | X | X |
| Great Western Chemical Company, Richmond | X | X |
| West Contra Costa Sanitary Landfill | -- | X |
| Witco Chemical Corporation | X | X |
| g. <u>San Pablo</u> | | |
| FMC Corporation Agricultural Chemical Group, Richmond | -- | X |
| Witco Chemical Corporation | -- | X |
| 5. <u>FRESNO COUNTY</u> | | |
| Big Blue Hills, Agricultural Pesticide Control Disposal Site | X | X |
| Chevron U.S.A., Inc., 23 D Disposal Site | X | X |
| Environmental Disposal Services, Coalinga Facility | X | X |
| FMC Corporation Agricultural Chemical Group, Fresno | X | X |
| General Cable Company | X | X |
| Westside Waste Management | -- | X |
| a. <u>Coalinga</u> | | |
| Westside Waste Management | X | X |
| b. <u>Fresno</u> | | |
| FMC Corporation Agricultural Chemical Group, Fresno | -- | X |
| 6. <u>HUMBOLDT COUNTY</u> | | |
| Humboldt Bay Power Plant, King Salmon Road | X | X |
| 7. <u>IMPERIAL COUNTY</u> | | |
| IT Transportation Corporation -- Imperial | X | X |
| 8. <u>INYO COUNTY</u> | | |
| Naval Weapons Center | X | X |

| | <u>HWP</u> | <u>BZP</u> |
|---|------------|------------|
| 9. <u>KERN COUNTY</u> | | |
| Bakersfield Welding Supply | X | X |
| Chevron U.S.A. Inc., 3 C Disposal Site | X | X |
| Chevron U.S.A. Inc., 5 K Disposal Site | X | X |
| Elk Hills Disposal Site, 10G/Naval Petro Res. No. 1 | X | X |
| EPC Eastside Disposal Farm | X | X |
| EPC Westside Disposal Farm | X | X |
| General Electric Flight Test Center | X | X |
| Getty Refining and Marketing Company | X | X |
| IT Corporation -- Bakersfield Services | X | X |
| IT Transportation Corporation -- Taft Facility | X | X |
| Liquid Waste Management, Inc. | X | X |
| M. P. Disposal Company, Inc. | X | X |
| M. P. Oil Company, Inc. | X | X |
| NASA DFRC | X | X |
| Naval Petroleum Reserve No. 1 | X | X |
| Naval Weapons Center, China Lake | X | X |
| Pentland Disposal Site | X | X |
| Tosco Corporation -- Bakersfield Refinery | X | X |
| Unico Chemicals Inc. | X | X |
| United States Borax and Chemical Company | | |
| Warren Petroleum Company, Yowlumne Plant | | |
| a. <u>Bakersfield</u> | | |
| Bakersfield Welding Supply | -- | X |
| b. <u>Maricopa</u> | | |
| Pentland Disposal Site | -- | X |
| 10. <u>KINGS COUNTY</u> | | |
| Beacon Oil Company | -- | X |
| Chemical Waste Management Inc., Kettleman Hills | X | X |
| Chevron U.S.A. Inc., 35 Q Disposal Site | X | X |
| Kettleman North Dome | X | X |
| Liquid Chemical Corporation | X | X |
| a. <u>Hanford</u> | | |
| Beacon Oil Company | X | X |
| Liquid Chemical Corporation | X | X |

| | <u>HWP</u> | <u>BZP</u> |
|--|------------|------------|
| 11. <u>LAKE COUNTY</u> | | |
| Highland Landfill | X | X |
| IT Environmental Corporation -- Lake County | X | X |
| The Geysers Power Plant | -- | X |
| 12. <u>LOS ANGELES COUNTY</u> | | |
| BKK Sanitary Landfill | -- | X |
| Cal-Style Furniture Manufacturing Company | X | X |
| Dart Industries Inc., Saugus | X | X |
| Lubrication Company of America | X | X |
| R and R Industrial Waste Haulers | X | X |
| Ram Chemicals Division | -- | X |
| a. <u>Burbank</u> | | |
| Lockheed California Company, Plant B6 Waste Treatment | X | X |
| b. <u>Carson</u> | | |
| Arco Petroleum Prod. Company, Watson Refinery | X | X |
| Baron-Blakeslee Division Purex Corp., Gardena | -- | X |
| Ram Chemicals Div (formerly L.A. Coatings & Chemicals) | X | X |
| c. <u>Compton</u> | | |
| Baron-Blakeslee Division Purex Corporation, Gardena | -- | X |
| d. <u>Gardena</u> | | |
| Baron-Blakeslee Division Purex Corporation, Gardena | X | X |
| Mechanical Metal Finishing Company | X | X |
| Ram Chemicals Division | -- | X |
| e. <u>Huntington Park</u> | | |
| Bethlehem Steel Corporation, Los Angeles Plant | -- | X |
| f. <u>La Mirada</u> | | |
| Dart Industries Inc., Santa Fe Springs | -- | X |
| g. <u>La Puente</u> | | |
| Dart Industries Inc., Saugus | -- | X |

| | <u>HWP</u> | <u>BZP</u> |
|---|------------|------------|
| h. <u>Long Beach</u> | | |
| Cal-Style Furniture Manufacturing Company | -- | X |
| IT Transportation Corporation - Long Beach (formerly Routh Transportation and Transfer Facility) | X | X |
| SCE Lighthipe Pole Yard | X | X |
| i. <u>Los Angeles</u> | | |
| Filtrol Corporation | X | X |
| IT Transportation Corporation - Wilmington (formerly Fix & Brain Vacuum Truck Service) | X | X |
| IT Corporation -- Wilmington Services | X | X |
| Martin Marietta Aluminum, Inc. | X | X |
| Oxy Mental Industries Corporation | X | X |
| Peairs Engineers | X | X |
| j. <u>Maywood</u> | | |
| Bethlehem Steel Corporation, Los Angeles Plant | -- | X |
| k. <u>Paramount</u> | | |
| Anaconda Industries -- Brass Division | X | X |
| SCE Lighthipe Pole Yard | -- | X |
| l. <u>Santa Fe Springs</u> | | |
| Dart Industries Inc., Santa Fe Springs | X | X |
| m. <u>Torrance</u> | | |
| Jones Chemical Inc. | X | X |
| Martin Marietta Aluminum Inc. | -- | X |
| n. <u>Vernon</u> | | |
| Bethlehem Steel Corporation, Los Angeles Plant | X | X |
| Filtrol Corporation | -- | X |
| Philip A. Hunt Chemical Corporation | X | X |
| o. <u>West Covina</u> | | |
| BKK Sanitary Landfill | X | X |

| | | <u>HWP</u> | <u>BZP</u> |
|-----|---|------------|------------|
| 13. | <u>MADERA COUNTY</u> | | |
| | Certainteed Chowchilla Plant | X | X |
| | Georgia Pacific Corporation PKG Division | X | X |
| | a. <u>Madera</u> | | |
| | Georgia Pacific Corporation, PKG Division | -- | X |
| 14. | <u>MENDOCINO COUNTY</u> | | |
| | The Geysers Power Plant | -- | X |
| 15. | <u>MERCED COUNTY</u> | | |
| | Castle Air Force Base | X | X |
| 16. | <u>MONTEREY COUNTY</u> | | |
| | Aurignac Industrial Waste Plant | X | X |
| | Moss Landing Power Plant | X | X |
| | Soilserv Inc., Salinas | -- | X |
| | Soilserv Inc., King City | X | X |
| | U.S. Army -- Fort Ord | -- | X |
| | a. <u>King City</u> | | |
| | Soilserv Inc., King City | -- | X |
| | b. <u>Marina</u> | | |
| | U.S. Army -- Fort Ord | -- | X |
| | c. <u>Salinas</u> | | |
| | Soilserv Inc., Salinas | X | X |
| | d. <u>Seaside</u> | | |
| | U.S. Army -- Fort Ord | -- | X |
| 17. | <u>NAPA COUNTY</u> | | |
| | W. L. Howard Termite Control | -- | X |
| | a. <u>Napa</u> | | |
| | W. L. Howard Termite Control | X | X |

| | <u>HWP</u> | <u>BZP</u> |
|---|------------|------------|
| 18. <u>NEVADA COUNTY</u> | | |
| The Grass Valley Group, Inc. | X | X |
| 19. <u>ORANGE COUNTY</u> | | |
| Rockwell International Corp., Newport Beach | -- | X |
| a. <u>Anaheim</u> | | |
| Arnold Magnetics and Electronics | -- | X |
| b. <u>Brea</u> | | |
| Petrolite Corp Tretolite Division | X | X |
| Union Chemicals Division, Union Oil Company | X | X |
| c. <u>Fullerton</u> | | |
| Arnold Magnetics and Electronics | X | X |
| Petrolite Corporation Tretolile Division | X | X |
| Union Chemicals Division, Union Oil Company | X | X |
| d. <u>Garden Grove</u> | | |
| Naval Weapons Station, Seal Beach | -- | X |
| e. <u>Huntington Beach</u> | | |
| Naval Weapons Station, Seal Beach | -- | X |
| f. <u>Irvine</u> | | |
| Rockwell International Corporation, Newport Beach | -- | X |
| g. <u>Newport Beach</u> | | |
| Rockwell International Corporation, Newport Beach | X | X |
| h. <u>Placentia</u> | | |
| Union Chemicals Division, Union Oil Company | -- | X |
| i. <u>Seal Beach</u> | | |
| Naval Weapons Station, Seal Beach | X | X |

| | <u>HWP</u> | <u>BZP</u> |
|---|------------|------------|
| j. <u>University of California -- Irvine</u> | | |
| Rockwell International Corporation, Newport Beach | -- | X |
| k. <u>Westminister</u> | | |
| Naval Weapons Station, Seal Beach | -- | X |
| 20. <u>PLACER COUNTY</u> | | |
| B.F.P.C. Foresthill Division | X | X |
| 21. <u>RIVERSIDE COUNTY</u> | | |
| Yates Industries Inc., A Square D Co. | -- | X |
| a. <u>Beaumont</u> | | |
| Yates Industries Inc., A Square D Co. | X | X |
| b. <u>Perris</u> | | |
| Techalloy Western Inc. | X | X |
| 22. <u>SACRAMENTO COUNTY</u> | | |
| Aerojet Liquid Rocket Company | X | X |
| Aerojet Solid Propulsion Company, Strategic Systems | X | X |
| Aerojet Strategic Propulsion Company | X | X |
| Cordova Chemical Company | X | X |
| 23. <u>SAN BENITO COUNTY</u> | | |
| Almaden Vineyards Inc., Paicines Ranch | X | X |
| Soilserve Inc., Hollister | -- | X |
| Teledyne McCormick Selph | X | X |
| a. <u>Hollister</u> | | |
| Soilserv Inc., Hollister | X | X |

| | <u>HWP</u> | <u>BZP</u> |
|--|------------|------------|
| 24. <u>SAN BERNARDINO COUNTY</u> | | |
| Aerochem, Inc. | X | X |
| Cool Water Generating Station | X | X |
| General American Transportation Corporation | -- | X |
| Kaiser Steel Corporation, S.M.G., Fontana Works | X | X |
| Koppers Company, Inc. | X | X |
| Mountain Pass Operations | X | X |
| Naval Weapons Center | X | X |
| Topock Compressor Station | X | X |
| a. <u>Adelanto</u> | | |
| Aerochem, Inc. | -- | X |
| b. <u>Colton</u> | | |
| General American Transportation Corporation | X | X |
| c. <u>Rancho Cucamonga</u> | | |
| SCE Etiwanda Generating Station | X | X |
| 25. <u>SAN DIEGO COUNTY</u> | | |
| Otay Solid Waste Disposal Site | X | X |
| a. <u>Carlsbad</u> | | |
| Burroughs Corporation | X | X |
| b. <u>San Diego</u> | | |
| Baron-Blakeslee Division, Purex Corporation, San Diego | X | X |
| 26. <u>SAN FRANCISCO COUNTY</u> | | |
| a. <u>San Francisco</u> | | |
| Portero Power Plant | X | X |
| Hunters Point Power Plant | X | X |

| | <u>HWP</u> | <u>BZP</u> |
|---|------------|------------|
| 27. <u>SAN JOAQUIN COUNTY</u> | | |
| Defense Depot, Tracy | X | X |
| Forward, Inc. | X | X |
| Lawrence Livermore Laboratory -- Site 300 (Dept. of Energy) | X | X |
| Lawrence Livermore Laboratory -- Site 300 (U. C. Regents) | X | X |
| Physics International Company | X | X |
| a. <u>Stockton</u> | | |
| Great Western Chemical Company, Stockton | X | X |
| 28. <u>SAN LUIS OBISPO COUNTY</u> | | |
| Diablo Canyon Power Plant | X | X |
| Santa Maria Refinery | X | X |
| a. <u>Morro Bay</u> | | |
| Morro Bay Power Plant | X | X |
| 29. <u>SAN MATEO COUNTY</u> | | |
| a. <u>South San Francisco</u> | | |
| MRI Corporation | X | X |
| 30. <u>SANTA BARBARA COUNTY</u> | | |
| Casmalia Disposal | X | X |
| CBS Records Division | -- | X |
| a. <u>Santa Maria</u> | | |
| CBS Records Division | X | X |
| 31. <u>SANTA CLARA COUNTY</u> | | |
| American Microsystems, Inc. | -- | X |
| Coyote Center | X | X |
| IT Corporation -- San Jose Transfer Facility | -- | X |
| a. <u>Cupertino</u> | | |
| American Microsystem, Inc. | -- | X |

| | | <u>HWP</u> | <u>BZP</u> |
|-----|--|------------|------------|
| b. | <u>Milpitas</u> | | |
| | Cook Paint and Varnish Company | X | X |
| | Exide Inc. (formerly ESB, Inc.) | X | X |
| | Ford Motor Company | X | X |
| | Great Western Chemical Company, Milpitas | X | X |
| c. | <u>Mountain View</u> | | |
| | Mountain View Landfill Gas Recovery Facility | X | X |
| d. | <u>San Jose</u> | | |
| | Exide Inc. (formerly ESB, Inc.) | -- | X |
| | IT Corporation -- San Jose Transfer Facility | X | X |
| | Safety Specialists, Inc. | -- | X |
| e. | <u>Santa Clara</u> | | |
| | American Microsystems, Inc. | X | X |
| | Hewlett Pakcard, Data Terminals Division | -- | X |
| | Safety Specialists, Inc. | X | X |
| f. | <u>Stanford University</u> | | |
| | Stanford University | X | X |
| g. | <u>Sunnyvale</u> | | |
| | American Microsystems, Inc. | -- | X |
| | Hewlett Packard, Data Terminals Division | X | X |
| 32. | <u>SANTA CRUZ COUNTY</u> | | |
| | City of Santa Cruz Sanitary Landfill | X | X |
| 33. | <u>SHASTA COUNTY</u> | | |
| | Shasta County Department of Agriculture | -- | X |
| | Valley Plating Company | X | X |
| | a. <u>Redding</u> | | |
| | Shasta County Department of Agriculture | X | X |
| 34. | <u>SISKIYOU COUNTY</u> | | |
| | City of Tulelake Landfill Operation | X | X |
| | Weed Treating Plant | X | X |

| | | <u>HWP</u> | <u>BZP</u> |
|-----|---|------------|------------|
| a. | <u>Weed</u> | | |
| | Weed Treating Plant | -- | X |
| 35. | <u>SOLANO COUNTY</u> | | |
| | Aqua Clear Farms Drilling Mud Dumpsite | X | X |
| | Exxon Benicia Refinery | -- | X |
| | IT Corporation -- Benicia Facility | -- | X |
| | IT Corporation -- Montezuma Hills | X | X |
| | Mare Island Sanitary Landfill | -- | X |
| a. | <u>Benicia</u> | | |
| | Exxon Benicia Refinery | X | X |
| | IT Corporation -- Benicia Facility | X | X |
| b. | <u>Vallejo</u> | | |
| | Mare Island Sanitary Landfill | X | X |
| 36. | <u>SONOMA COUNTY</u> | | |
| | The Geysers Power Plant | X | X |
| 37. | <u>STANISLAUS COUNTY</u> | | |
| | FMC Corporation/Alkali Chemicals Division | -- | X |
| | Riverbank Army Ammunition Plant | X | X |
| | West Hills Hazardous Waste Facility | X | X |
| a. | <u>Modesto</u> | | |
| | FMC Corporation/Alkali Chemicals Division | X | X |
| b. | <u>Patterson</u> | | |
| | Stanislaus County Agricultural Commission | X | X |
| 38. | <u>TULARE COUNTY</u> | | |
| | Beckman Instruments, Inc. | X | X |
| a. | <u>Porterville</u> | | |
| | Beckman Instruments, Inc. | -- | X |

| | <u>HWP</u> | <u>BZP</u> |
|--|------------|------------|
| b. <u>Visalia</u> | | |
| Prestolite Battery Division of Eltra Corporation | X | X |
| 39. <u>VENTURA COUNTY</u> | | |
| Northrop Corporation, Ventura Division | -- | X |
| Rockwell International Rocketdyne Division | X | X |
| a. <u>Port Hueneme</u> | | |
| Naval Construction Battalion Center | X | X |
| b. <u>Simi Valley</u> | | |
| Simi Valley Sanitary Landfill | X | X |
| c. <u>Thousand Oaks</u> | | |
| Northrop Corporation, Ventura Division | X | X |

FACILITY NAME/PHYSICAL LOCATION

FACILITY OPERATOR/MAILING ADDRESS

Acme Fill Corporation
End of Arthur Road
Martinez, CA 94553
County: Contra Costa

Acme Fill Corporation
P. O. Box 23164
Pleasant Hill, CA 94523

Aerochem Incorporated
4011 El Mirage Road
Adelanto, CA 92301
County: San Bernardino

Aerochem Incorporated
1885 North Batavia Street
Orange, CA 92667

Aerojet Liquid Rocket Co
Highway 50 & Aerojet Road
Nimbus, CA
County: Sacramento

Aerojet Liquid Rocket Co
P. O. Box 13222
Sacramento, CA 95813

Aerojet Solid Propulsion Co-Strategic Sys
Highway 50 & Hazel Avenue
Nimbus, CA
County: Sacramento

Aerojet Solid Propulsion Co-Strategic S
P. O. Box 13400
Sacramento, CA 95813

Aerojet Strategic Propulsion Co
Highway 50 & Hazel Avenue
Nimbus, CA
County: Sacramento

Aerojet Strategic Propulsion Co
P. O. Box 15699C
Sacramento, CA 95813

Almaden Vineyards Inc, Paicines Ranch
Airline Highway
Paicines, CA 95043
County: San Benito

Almaden Vineyards Incorporated
223 Panoche Road
Paicines, CA 95043

American Forest Products Corporation
Highway 49
Martell, CA 95654
County: Amador

American Forest Products Corporation
Highway 49
Martell, CA 95654

(formerly Bendix Forest Products Corp)

FACILITY NAME/PHYSICAL LOCATION

American Microsystems, Inc
3800 Homestead Road
Santa Clara, CA 95051
County: Santa Clara

Anaconda Industries - Brass Division
14900 Garfield Avenue
Paramount, CA 90723
County: Los Angeles

Aqua Clear Farms Drilling Mud Dumpsite
1500 feet west of Hwy 113 on Flannery Road
Solano County, CA
County: Solano

Arco Petroleum Prod Co, Watson Refinery
1801 East Sepulveda Boulevard.
Carson, CA 90745
County: Los Angeles

Arnold Magnetics & Electronics
1551 East Orangethorpe Avenue
Fullerton, CA 92634
County: Orange

Aurignac Industrial Waste Plant
8 Mi S of San Ardo/Hwy 101 Frontage Rd off-ramp
San Ardo, CA 93450
County: Monterey

Avon Power Plant
350 Solano Way
Martinez, CA 94553
County: Contra Costa

FACILITY OPERATOR/MAILING ADDRESS

American Microsystems, Inc
3800 Homestead Road
Santa Clara, CA 95051

Anaconda Industries - Brass Division
14900 Garfield Avenue
Paramount, CA 90723

Noel F. Hatch
2510 West Orange
Anaheim, CA 92804

Atlantic Richfield Company
1801 East Sepulveda Boulevard
Carson, CA 90745

Arnold Magnetics & Electronics
P. O. Box 3220
Fullerton, CA 92634

Estate of A. Aurignac/L. Aurignac Admin
P. O. Box 331
San Ardo, CA 93450

Pacific Gas & Electric Company
77 Beale Street
San Francisco, CA 94106

FACILITY NAME/PHYSICAL LOCATION

FACILITY OPERATOR/MAILING ADDRESS

B.F.P.C. Foresthill Division
Auburn Foresthill Road
Foresthill, CA 95631
County: Placer

Bendix Forest Products Corp
P. O. Box 685
Foresthill, CA 95631

Bakersfield Welding Supply
Standard Street
Bakersfield, CA
County: Kern

Bakersfield Welding Supply
619 16th Street
Bakersfield, CA 93301

Baron-Blakeslee Div, Purex Corp
8333 Enterprise Drive
Newark, CA 94560
County: Alameda

Baron-Blakeslee Div, Purex Corp
8333 Enterprise Drive
Newark, CA 94560

Baron-Blakeslee Div, Purex Corp
525 East Alondra Boulevard
Gardena, CA 90248
County: Los Angeles

Baron-Blakeslee Div, Purex Corp
525 East Alondra Boulevard
Gardena, CA 90248

Baron-Blakeslee Div, Purex Corp
3596 California Street
San Diego, CA 92101
County: San Diego

Baron-Blakeslee Div, Purex Corp
3596 California Street
San Diego, CA 92101

Beacon Oil Company
525 West Third Street
Hanford, CA 93230
County: Kings

Beacon Oil Company
P. O. Box 466
Hanford, CA 93230

Beckman Instruments, Incorporated
167 West Poplar Avenue
Porterville, CA 93257
County: Tulare

Beckman Instruments, Incorporated
167 West Poplar Avenue
Porterville, CA 93257

FACILITY NAME/PHYSICAL LOCATION

FACILITY OPERATOR/MAILING ADDRESS

Bethlehem Steel Corp, Los Angeles Plant
3300 East Slauson Avenue
Vernon, CA 90058
County: Los Angeles

Bethlehem Steel Corporation
P. O. Box 2057
Los Angeles, CA 90058

Big Blue Hills, Agri Pesticide Cont Disp Site
Sec 3, T 19 S/R 15 E MDBM
Fresno, CA
County: Fresno

Resources and Development Department
4499 East King Canyon Road
Fresno, CA 93702

BKK Sanitary Landfill
2210 South Azusa Avenue
West Covina, CA
County: Los Angeles

BKK Sanitary Landfill
2550 237th Street
Torrance, CA 90505

Borden Incorporated
41100 Boyce Road
Fremont, CA 94538
County: Alameda

Borden Incorporated
41100 Boyce Road
Fremont, CA 94538

Burroughs Corporation
5600 Avenida Encinas
Carlsbad, CA 92008
County: San Diego

Burroughs Corporation
5600 Avenida Encinas
Carlsbad, CA 92008

Cal-Style Furniture MFG Company
3015 East Ana Street
Compton, CA 90221
County: Los Angeles

Cal-Style Furniture MFG Company
3015 East Ana Street
Compton, CA 90221

Casmalia Disposal
NTU Road
Casmalia, CA 93429
County: Santa Barbara

Casmalia Disposal
P. O. Box 5275
Santa Barbara, CA 93108

FACILITY NAME/PHYSICAL LOCATION

Castle Air Force Base

Castle AFB, CA 95342

County: Merced

CBS Records Div

900 East Stowell Road

Santa Maria, CA 93454

County: Santa Barbara

Cerro Metal Products, California Works

6707 Mowry Avenue

Newark, CA 94560

County: Alameda

Certainteed Chowchilla Plant

17775 Avenue 23½

Chowchilla, CA 93610

County: Madera

Chem Waste Mgmt Inc-Kettleman Hills

2.5 Mi West on I-5 & Route #41

Kettleman City, CA 93239

County: Kings

Chevron Chemical Company

940 Hensley Street

Richmond, CA 94804

County: Contra Costa

Chevron U.S.A. Inc, 23 D Disposal Site

Cntrl Portion, Sec 23, T 20 S/R 14 E MDBM

Fresno, CA

County: Fresno

FACILITY OPERATOR/MAILING ADDRESS

U. S. Air Force

93 C.S.G./D.E.E.V.

Castle AFB, CA 95342

CBS Incorporated

900 East Stowell Road

Santa Maria, CA 93454

The Marmon Group Incorporated

6707 Mowry Avenue

Newark, CA 94560

Certainteed Corporation

P. O. Box 205

Chowchilla, CA 93610

Chem Waste Mgmt Inc-Kettleman Hills

P. O. Box 255

Kettleman City, CA 93239

Chevron Chemical Company

940 Hensley Street

Richmond, CA 94804

Chevron U.S.A. Incorporated

P. O. Box 5355

Bakersfield, CA 93308

FACILITY NAME/PHYSICAL LOCATION

Chevron U.S.A. Inc, 3 C Disposal Site
NW Cor, Sec 3, T 32 S/R 23 E MDBM
Bakersfield, CA 93308
County: Kern

Chevron U.S.A. Inc, 35 Q Disposal Site
Sec 35, T 22 S/R 18 E MDBM
Kettleman City, CA
County: Kings

Chevron U.S.A. Inc, 5 K Disposal Site
SE Cor, Sec 5, T 11 N/R 23 W SBBM
Bakersfield, CA 93308
County: Kern

Chevron U.S.A., Richmond Refinery
576 Standard Avenue
Richmond, CA 94802
County: Contra Costa

City of Santa Cruz Sanitary Landfill
Dimco Lane
Santa Cruz, CA
County: Santa Cruz

City of Tulalake Landfill Operation
Sheepy Ridge Road
Tulalake, CA 96134
County: Siskiyou

Colgate-Palmolive Company
2700 7th Street
Berkeley, CA 94710
County: Alameda

FACILITY OPERATOR/MAILING ADDRESS

Chevron U.S.A. Incorporated
P. O. Box 5355
Bakersfield, CA 93308

Chevron U.S.A. Incorporated
P. O. Box 5355
Bakersfield, CA 93308

Chevron U.S.A. Incorporated
P. O. Box 5355
Bakersfield, CA 93308

Chevron U.S.A., Richmond Refinery
P. O. Box 1272
Richmond, CA 94802

City of Santa Cruz
809 Center Street
Santa Cruz, CA 95060

Siskiyou County & Modoc County
P. O. Box 456
Tulalake, CA 96134

Colgate-Palmolive Company
2700 7th Street
Berkeley, CA 94710

FACILITY NAME/PHYSICAL LOCATION

Colusa County Landfill
Stonyford/Ladoga Road
Colusa, CA 95932
County: Colusa

Colusa County Landfill
Evans & Haun Roads
Colusa, CA 95932
County: Colusa

Contra Costa Power Plant
1456 Wilbur Avenue
Antioch, CA 94509
County: Contra Costa

Cook Paint & Varnish Company
201 Sinclair Frontage Road
Milpitas, CA 95035
County: Santa Clara

Cool Water Generating Station
East Santa Fe Street
Daggett, CA 92327
County: San Bernardino

Cordova Chemical Company
Highway 50 at Hazel Avenue
Nimbus - Sacto, CA
County: Sacramento

Coyote Center
600 Metcalf Road
Santa Clara, CA 95138
County: Santa Clara

FACILITY OPERATOR/MAILING ADDRESS

Colusa County Landfill
546 Jay Street
Colusa, CA 95932

Colusa County Landfill
546 Jay Street
Colusa, CA 95932

Pacific Gas & Electric Co
P. O. Box 249
Antioch, CA 94509

Cook Paint & Varnish Company
P. O. Box 1289
Milpitas, CA 95035

Southern California Edison
P. O. Box 337
Daggett, CA 92327

Cordova Chemical Company
P. O. Box 13400
Sacramento, CA 95813

United Technologies Corporation
P. O. Box 358
Sunnyvale, CA 94086

FACILITY NAME/PHYSICAL LOCATION

Dart Industries Incorporated
13911 East Gannet Street
Santa Fe Springs, CA 90670
County: Los Angeles

Dart Industries Incorporated
25655 Springbrook
Saugus, CA 91350
County: Los Angeles

Defense Depot, Tracy
Chrisman Road
Tracy, CA 95376
County: San Joaquin

Diablo Canyon Power Plant
Highway 101
Avila Beach, CA 93424
County: San Luis Obispo

Dow Chemical - Pittsburg Plant
End of Loveridge Road
Pittsburg, CA 94565
County: Contra Costa

Du Pont De Nemours & Co, Inc
Wilbur Avenue & Bridgehead Road
Antioch, CA 94509
County: Contra Costa

Elk Hills Disp Site 10G/Naval Petro Res No 1
SW ¼ Sec 10, T 31 S/R 24 E
Tupman, CA 93276
County: Kern

FACILITY OPERATOR/MAILING ADDRESS

Dart Industries Incorporated
13911 East Gannet Street
Santa Fe Springs, CA 90670

Dart Industries Incorporated
P. O. Box 398
Saugus, CA 91350

U. S. Department of Defense
Chrisman Road
Tracy, CA 95376

Pacific Gas & Electric Company
P. O. Box 56
Avila Beach, CA 93424

Dow Chemical - Pittsburg Plant
P. O. Box 1398
Pittsburg, CA 94565

Du Pont De Nemours & Co, Inc
P. O. Box 310
Antioch, CA 94509

Williams Brothers Engineering Co
P. O. Box 86
Tupman, CA 93276

FACILITY NAME/PHYSICAL LOCATION

Environmental Disposal Svcs, Coalinga Fac
Sec 36, T 19 S/R 14 E MDBM
Coalinga, CA
County: Fresno

EPC Eastside Disposal Farm
1.5 mi north of Round Mountain Rd.
Bakersfield, CA 93301
County: Kern

EPC Westside Disposal Farm
Shale Road & Highway 33
Fellows, CA 93224
County: Kern

Exide Corporation
700 Montaque Expressway
Milpitas, CA 95035
County: Santa Clara

Exxon Benicia Refinery
3400 East Second Street
Benicia, CA 94510
County: Solano

Filtrol Corporation
3200 East Washington Boulevard
Los Angeles, CA 90023
County: Los Angeles

FMC Corp Agricultural Chem Grp
855 Parr Boulevard
Richmond, CA 94804
County: Contra Costa

FACILITY OPERATOR/MAILING ADDRESS

Environmental Disposal Services
P. O. Box 1071
Coalinga, CA 93210

Environmental Protection Corp
3040 19th Street, Suite 10
Bakersfield, CA 93301

Environmental Protection Corp
3040 19th Street, Suite 10
Bakersfield, CA 93301

Exide Corporation
700 Montaque Expressway
Milpitas, CA 95035

Exxon Co, USA; Div of Exxon Corp
3400 East Second Street
Benicia, CA 94510

Filtrol Corporation
3200 East Washington Boulevard
Los Angeles, CA 90023

FMC Corp Agricultural Chem Grp
P. O. Box 1589
Richmond, CA 94804

FACILITY NAME/PHYSICAL LOCATION

FMC Corp Agricultural Chem Grp
2501 South Sunland Avenue
Fresno, CA 93725
County: Fresno

FMC Corp/Alkali Chemicals Div
1200 Barium Road
Modesto, CA 95352
County: Stanislaus

FMC Corporation
8787 Enterprise Drive
Newark, CA 94560
County: Alameda

Ford Motor Company
1100 South Main Street
Milpitas, CA 95035
County: Santa Clara

Forward Incorporated
Austin Road, 7 Mi SE of Stockton
Stockton, CA
County: San Joaquin

General American Transport. Corp
Slover & Pepper Avenues
Colton, CA 92324
County: San Bernardino

General Cable Company
1075 North Avenue
Sanger, CA 93657
County: Fresno

FACILITY OPERATOR/MAILING ADDRESS

FMC Corporation
P. O. Box 1386
Fresno, CA 93745

FMC Corp/Alkali Chemicals Div
P. O. Box 3808
Modesto, CA 95352

FMC Corporation
P. O. Box 344
Newark, CA 94560

Ford Motor Company
P. O. Box 1101
San Jose, CA 95108

Mr. G. J. Basso, VP
P. O. Box 6336
Stockton, CA 95206

General American Transport. Corp
120 South Riverside Plaza
Chicago, Il 60606

General Cable Company
1075 North Avenue
Sanger, CA 93657

FACILITY NAME/PHYSICAL LOCATION

FACILITY OPERATOR/MAILING ADDRESS

General Electric Flight Test Center
Building 1 - Mojave Airport
Mojave, CA 93501
County: Kern

General Electric
P. O. Box 700
Mojave, CA 93501

Georgia Pacific Corp PKG, Div
24600 Ave, 13
Madera, CA 93637
County: Madera

Georgia Pacific Corporation
P. O. Box 1327
Madera, CA 93637

Getty Refining & Marketing Co
6451 Rosedale Highway
Bakersfield, CA 93308
County: Kern

Getty Refining & Marketing Co
P. O. Box 1476
Bakersfield, CA 93302

Great Western Chemical Co
860 Wharf Street
Richmond, CA 94804
County: Contra Costa

McCall Oil & Chemical Corp
860 Wharf Street
Richmond, CA 94804

Great Western Chemical Co
945 Ames Boulevard
Milpitas, CA 94035
County: Santa Clara

McCall Oil & Chemical Corp
945 Ames Boulevard
Milpitas, CA 94035

Great Western Chemical Co
826 South Center Street
Stockton, CA 95206
County: San Joaquin

McCall Oil & Chemical Corp
826 South Center Street
Stockton, CA 95206

Hewlett Packard - Data Terminals Div
974 East Arques Avenue
Sunnyvale, CA 94086
County: Santa Clara

Hewlett Packard - Data Terminals Div
974 East Arques Avenue
Sunnyvale, CA 94086

FACILITY NAME/PHYSICAL LOCATION

FACILITY OPERATOR/MAILING ADDRESS

Highlands Landfill
Davis Street
Clearlake Highlands, CA
County: Lake

Lake County Public Works Dept
255 North Forbes Street
Lakeport, CA 95453

Humbolt Bay Power Plant
King Salmon Road & Highway 101
Eureka, CA 95501
County: Humbolt

Pacific Gas and Electric Company
77 Beale Street
San Francisco, CA 94106

Hunters Point Power Plant
1000 Evans Avenue
San Francisco, CA 94124
County: San Francisco

Pacific Gas & Electric Company
1000 Evans Avenue
San Francisco, CA 94124

Imperial West Chemical Co
Loveridge Road & Pittsburg-Antioch Hwy
Pittsburg, CA
County: Contra Costa

Imperial West Chemical Co
P. O. Box 696
Antioch, CA 94509

IT Corp - Baker & Vine Hill Facility
East End of Arthur Road
Martinez, CA 94553
County: Contra Costa

IT Corporation
336 West Anaheim Street
Wilmington, CA 90744

IT Corp - Bakersfield Services
3401 Fruitvale Avenue
Bakersfield, CA 93308
County: Kern

IT Corporation
336 West Anaheim Street
Wilmington, CA 90744

IT Corp - Benicia Facility
Lake Herman Road
Benicia, CA 94510
County: Solano

IT Corporation
336 West Anaheim Street
Wilmington, CA 90744

FACILITY NAME/PHYSICAL LOCATION

FACILITY OPERATOR/MAILING ADDRESS

IT Corp - San Jose Transfer Facility
3010 Zanker Road
San Jose, CA 95035
County: Santa Clara

IT Corporation
336 West Anaheim Street
Wilmington, CA 90744

IT Corp - Wilmington Services
336 West Anaheim Street
Wilmington, CA 90744
County: Los Angeles

IT Corporation
336 West Anaheim Street
Wilmington, CA 90744

IT Corporation - Lake County
7260 Highway 29
Near Kelseyville, CA
County: Lake

Mr. V. A. "Kip" Neasham
P. O. Box 911
Lakeport, CA 95453

IT Corporation - Montezuma Hills
Little Honker Bay Rd. & Collinsville Rd.
Collinsville, CA 94533
County: Solano

IT Corporation
336 West Anaheim Street
Wilmington, CA 90744

IT Transportation Corp - Imperial
Sect 16, T 13 S/ R 12 E
Imperial, CA 92251
County: Imperial

IT Transportation Corp - Imperial
336 West Anaheim Street
Wilmington, CA 90744

IT Transportation Corp - Long Beach
800 15th Street
Long Beach, CA 90813
County: Los Angeles

IT Corporation
336 West Anaheim Street
Wilmington, CA 90744

(formerly Routh Transport & Transfer Fac)

IT Transportation Corp - Northern Calif
4501 Pacheco Boulevard
Martinez, CA 94553
County: Contra Costa

IT Transportation Corp, Northern Calif
336 West Anaheim Street
Wilmington, CA 90744

FACILITY NAME/PHYSICAL LOCATION

IT Transportation Corp - Taft Facility
7004 Gas Company Road
Taft, CA 93268
County: Kern

IT Transportation Corp - Wilmington
233 East "D" Street
Wilmington, CA 90744
County: Los Angeles

(formerly Fix & Brain Vacuum Truck Svcs)

Jones Chemical Incorporated
1401 West Del Amo Boulevard
Torrance, CA 90507
County: Los Angeles

Kaiser Steel Corp S.M.G.-Fontana Works
9400 Cherry Avenue
Fontana, CA 92335
County: San Bernardino

Kettleman North Dome
Highway 41, Near I-5
Kettleman, CA
County: Kings

Koppers Company Incorporated
8810 Cherry Avenue
Fontana, CA 92335
County: San Bernardino

Lawrence Livermore Lab - Site 300
Corral Hollow Road
San Joaquin County, CA
County: Alameda
San Joaquin

FACILITY OPERATOR/MAILING ADDRESS

IT Transportation Corp - Taft Facility
336 West Anaheim Street
Wilmington, CA 90744

IT Corporation
336 West Anaheim Street
Wilmington, CA 90744

Jones Chemical Incorporated
100 Sunny Sol Boulevard
Caledonia, NY 14473

Kaiser Steel Corporation
P. O. Box 217
Fontana, CA 92335

McKay Trucking Company
P. O. Box 376
Coalinga, CA 93210

Koppers Company Incorporated
Box 489
Fontana, CA 92335

Department of Energy
1333 Broadway
Oakland, CA 94612

FACILITY NAME/PHYSICAL LOCATION

Lawrence Livermore Lab - Site 300
Corral Hollow Road
Livermore, CA 94550
County: Alameda
San Joaquin

Lawrence Livermore National Lab
7000 East Avenue
Livermore, CA 94550
County: Alameda

Liquid Chemical Corporation
10585 Industry Avenue
Hanford, CA 93230
County: Kings

Liquid Waste Management, Inc
27621 Westside Highway
McKittrick, CA
County: Kern

Lockheed Calif Co, Plant B6 Waste Treatment
2801 Hollywood Way
Burbank, CA 91520
County: Los Angeles

Lubrication Company of America
12500 Lang Station Road
Saugus, CA 91351
County: Los Angeles

M. P. Disposal Company, Inc
NE Cor Sec 2, T 28 S/R 28 E/MDBM
Bakersfield, CA 93308
County: Kern

FACILITY OPERATOR/MAILING ADDRESS

Regents of the University of Calif
P. O. Box 808, L-520
Livermore, CA 94550

Lawrence Livermore National Lab
P. O. Box 808, L-520
Livermore, CA 94550

Liquid Chemical Corporation
10585 Industry Avenue
Hanford, CA 93230

Liquid Waste Management, Inc
Drawer L
Taft, CA 93268

Lockheed California Company
Dept 3935, Bldg 85, PLT A1, Box 551
Burbank, CA 91520

Lubrication Company of America
12500 Lang Station Road
Saugus, CA 91351

M. P. Disposal Company, Inc
4506 McTavish Court
Bakersfield, CA 93308

FACILITY NAME/PHYSICAL LOCATION

FACILITY OPERATOR/MAILING ADDRESS

M. P. Oil Company, Incorporated
Round Mountain Road
Bakersfield, CA 93308
County: Kern

M. P. Oil Company, Incorporated
175 Ray Street
Bakersfield, CA 93308

Mare Island Sanitary Landfill
Mare Island Naval Shipyard
Vallejo, CA 94592
County: Solano

Commander, Mare Island Naval Shipyard
Mare Island Naval Shipyard
Vallejo, CA 94592

Martin Marietta Aluminum Inc
19200 South Western Avenue
Los Angeles, CA 90509
County: Los Angeles

Martin Marietta Aluminum
19200 South Western Avenue
Torrance, CA 90509

Martinez Power Plant
1622 Shell Avenue
Martinez, CA 94553
County: Contra Costa

Pacific Gas & Electric Company
77 Beale Street
San Francisco, CA 94106

Mechanical Metal Finishing Company
15220 South Broadway
Gardena, CA 90248
County: Los Angeles

Solomon - D. Naman
P. O. Box 352
Gardena, CA 90248

Morro Bay Power Plant
1290 Enbarcadero Road
Morro Bay, CA 93442
County: San Luis Obispo

Pacific Gas & Electric Company
P. O. Box 670
Morro Bay, CA 93442

Moss Landing Power Plant
Highway 1 & Dolan Road
Moss Landing, CA 95039
County: Monterey

Pacific Gas & Electric Company
P. O. Box 27
Moss Landing, CA 95039

FACILITY NAME/PHYSICAL LOCATION

Mountain Pass Operations
Bailey Road & Interstate Route 15
Mt. Pass, CA 92366
County: San Bernardino

MRI Corporation
270 East Grand Avenue
South San Francisco, CA 94080
County: San Mateo

Mtn View Landfill Gas Recovery Fac
Charleston Road & Highway 101
Mountain View, CA 94042
County: Santa Clara

NASA DFRC
Building 4800 Edwards Air Force Base
Edwards AFB, CA 93523
County: Kern

National Starch & Chemical Corp
742 Grayson Street
Berkeley, CA 94710
County: Alameda

Naval Construction Battalion Center
C B Center
Port Hueneme, CA 93043
County: Ventura

Naval Petroleum Reserve Number 1
Elk Hills
Tupman, CA 93276
County: Kern

FACILITY OPERATOR/MAILING ADDRESS

Molycorp, Incorporated
Mt. Pass Operations
Mt. Pass, CA 92366

MRI Corporation
719 Raritan Road
Clark, NJ 07066

Pacific Gas & Electric Company
245 Market Street
San Francisco, CA 94106

NASA DFRC
P. O. Box 273
Edwards AFB, CA 93523

National Starch & Chemical Corp
742 Grayson Street
Berkeley, CA 94710

Naval Construction Battalion Center
Code 80
Port Hueneme, CA 93043

William Brothers Engineering Co
P. O. Box 86
Tupman, CA 93276

FACILITY NAME/PHYSICAL LOCATION

FACILITY OPERATOR/MAILING ADDRESS

Naval Weapons Center

United States Navy

China Lake, CA 93555
County: Kern

China Lake, CA 93555

Naval Weapons Station - Seal Beach
Seal Beach Boulevard
Seal Beach, CA 90740
County: Orange

United States Navy
Seal Beach Boulevard
Seal Beach, CA 90740

Northrop Corp - Ventura Division
1515 Rancho Conejo Boulevard
Newbury Park, CA 91320
County: Ventura

Northrop Corporation
1515 Rancho Conejo Boulevard
Newbury Park, CA 91320

Oakland Power Plant
50 Grove Street
Oakland, CA 94623
County: Alameda

Pacific Gas & Electric Company
50 Grove Street
Oakland, CA 94623

Oakland Scavenger Co, Altamont Landfill
10840 Altamont Pass Road
Livermore, CA 94550
County: Alameda

Oakland Scavenger Company
2601 Peralta Street, Engrng Dept
Oakland, CA 94607

Oleum Power Plant
1150 San Pablo Avenue
Rodeo, CA 94572
County: Contra Costa

Pacific Gas & Electric Company
77 Beale Street
San Francisco, CA 94106

Otay Solid Waste Disposal Site
2 Miles East of I 805
Otay, CA
County: San Diego

San Diego Co., Solid Waste Division
5555 Overland Avenue
San Diego, CA 92123

FACILITY NAME/PHYSICAL LOCATION

Oxy Metal Industries Corporation
20801 Nordhoff Street
Chatsworth, CA 91311
County: Los Angeles

Pacific Refining Company
San Pablo Avenue
Hercules, CA 94547
County: Contra Costa

Peairs Engineers
3521 Temple Street
Los Angeles, CA 90004
County: Los Angeles

Pentland Disposal Site
Maricopa Highway
Maricopa, CA 93252
County: Kern

Peterbilt Motors Company
38801 Cherry Street
Newark, CA 94560
County: Alameda

Petrolite Corp Tretolite Div
200 South Puente Street
Brea, CA 92621
County: Orange

Philip A. Hunt Chemical Corp
4265 Charter Street
Los Angeles, CA 90058
County: L. s Angeles

FACILITY OPERATOR/MAILING ADDRESS

Oxy Metal Industries Corporation
20801 Nordhoff Street
Chatsworth, CA 91311

Pacific Refining Company
P. O. Box 68
Hercules, CA 94547

David N. Peairs
315 North Hoover Street
Los Angeles, CA 90004

Derrick Engineering Contractors
1618 28th Street
Bakersfield, CA 93301

Peterbilt Motors Company
38801 Cherry Street
Newark, CA 94560

Petrolite Corp Tretolite Div
200 South Puente Street
Brea, CA 92621

Philip A. Hunt Chemical Corp
4265 Charter Street
Los Angeles, CA 90058

FACILITY NAME/PHYSICAL LOCATION

FACILITY OPERATOR/MAILING ADDRESS

Physics International Company
3.2 Mi West of I 580 on Corral Hollow Rd
Tracy, CA 95376
County: San Joaquin

Physics International Company
2700 Merced Street
San Leandro, CA 94577

Pittsburg Power Plant
696 West 10th Street
Pittsburg, CA 94565
County: Contra Costa

Pacific Gas & Electric Co
P. O. Box 590
Pittsburg, CA 94565

Portero Power Plant
1201 Illinois Street
San Francisco, CA 94107
County: San Francisco

Pacific Gas & Electric Company
1201 Illinois Street
San Francisco, CA 94107

Prestolite Battery Div of Eltra Corp
8127 Avenue 304
Visalia, CA 93277
County: Tulare

Eltra Corporation
P. O. Box 3067
Visalia, CA 93277

R & R Industrial Waste Haulers
12618 South Main
Los Angeles, CA 90061
County: Los Angeles

R & R Industrial Waste Haulers
12625 South Main
Los Angeles, CA 90061

Ram Chemicals Division
210 East Alondra Boulevard
Gardena, CA 90248
County: Los Angeles

Ram Chemicals Division, Whittier Corp.
P. O. Box 192
Gardena, CA 90248

Riverbank Army Ammunition Plant
5300 Claus Road
Riverbank, CA 95367
County: Stanislaus

Norris Industries
P. O. Box 856
Riverbank, CA 95367

FACILITY NAME/PHYSICAL LOCATION

FACILITY OPERATOR/MAILING ADDRESS

Rockwell International Corporation
4311 Jamboree Road
Newport Beach, CA 92660
County: Orange

Rockwell International Corporation
P. O. Box C
Newport Beach, CA 92660

Rockwell International Rocketdyne Div
Woosey Canyon Road
Simi Hills, CA
County: Ventura

Rockwell International Corporation
6633 Canoga Avenue
Canoga Park, CA 91304

Safety Specialists Incorporated
3284F Edward Avenue
Santa Clara, CA 95050
County: Santa Clara

Safety Specialists Incorporated
3284F Edwards Avenue
Santa Clara, CA 95050

Santa Maria Refinery
Route 3 Box 7600
Arroyo Grande, CA 93420
County: San Luis Obispo

Union Oil Company of California
Route 3 Box 7600
Arroyo Grande, CA 93420

SCE Etiwanda Generating Station
8995 Etiwanda
Etiwanda, CA 91739
County: San Bernardino

Southern California Edison
8996 Etiwanda
Etiwanda, CA 91739

SCE Lighthipe Pole Yard
6900 North Orange
Long Beach, CA 90805
County: Los Angeles

Southern California Edison
6900 North Orange
Long Beach, CA 90805

Shasta Co Dept of Agriculture
2490 Radio Lane
Redding, CA 96001
County: Shasta

Shasta Co Dept of Agriculture
2430 Hospital Lane, Room 40
Redding, CA 96001

FACILITY NAME/PHYSICAL LOCATION

FACILITY OPERATOR/MAILING ADDRESS

Shell Oil Co, Martinez MFG Complex
Marina Vista Avenue
Martinez, CA 94553
County: Contra Costa

Shell Oil Company
P. O. Box 711
Martinez, CA 94553

Simi Valley Sanitary Landfill
111 East Los Angeles Avenue
Simi Valley, CA 93065
County: Ventura

Ventura Regional Co Sanitation Dist
P. O. Box AB
Ventura, CA 93002

Soilserv Incorporated
1427 Abbott Street
Salinas, CA 93901
County: Monterey

Soilserv Incorporated
P. O. Box 3650
Salinas, CA 93912

Soilserv Incorporated
999 Bitterwater Road
King City, CA 93930
County: Monterey

Soilserv Incorporated
P. O. Box 3650
Salinas, CA 93912

Soilserv Incorporated
1601 Shelton Drive
Hollister, CA 95023
County: San Benito

Soilserv Incorporated
P. O. Box 3650
Salinas, CA 93912

Stanford University
Campus Drive & Panama
Stanford, CA 94305
County: Santa Clara

Stanford University
71 Encina Hall
Stanford, CA 94305

Stanislaus Co Agricultural Comm
301 South First Street
Patterson, CA 95363
County: Stanislaus

Stanislaus Co Agricultural Comm
725 County Center 3 Court
Modesto, CA 95355

FACILITY NAME/PHYSICAL LOCATION

Stauffer Chemical Company
100 Mococo Road
Martinez, CA 94553
County: Contra Costa

Techalloy Western Incorporated
2500 South A Street
Perris, CA 92370
County: Riverside

Teledyne McCormick Selph
3601 Union Road
Hollister, CA 95023
County: San Benito

The Geysers Power Plant
P. O. Box 456
Healdsburg, CA 95448
County: Sonoma

The Grass Valley Group Inc
13024 Bitney Springs Road
Grass Valley, CA 95945
County: Nevada

Topock Compressor Station
15 Mi East of Needles on I-40
Needles, CA 92363
County: San Bernardino

Tosco Corp - Bakersfield Refinery
6500 Refinery Avenue
Bakersfield, CA 93308
County: Kern

FACILITY OPERATOR/MAILING ADDRESS

Stauffer Chemical Company
100 Mococo Road
Martinez, CA 94553

Techalloy Western Incorporated
2500 South A Street
Perris, CA 92370

Teledyne McCormick Selph
P. O. Box 6
Hollister, CA 95023

Pacific Gas & Electric Company
77 Beale Street
San Francisco, CA 94106

The Grass Valley Group Inc
P. O. Box 1114
Grass Valley, CA 95945

Pacific Gas & Electric Company
P. O. Box 337
Needles, CA 92363

Tosco Corporation
P. O. Box 2860
Bakersfield, CA 93303

FACILITY NAME/PHYSICAL LOCATION

Tosco Corp, Lion Oil Div - Avon Refinery
Route 4 & Solano Way
Martinez, CA 94553
County: Contra Costa

U. S. Army - Fort Ord

Fort Ord, CA 93941
County: Monterey

Unico Chemicals Incorporated
7101 Edison Highway
Bakersfield, CA 93307
County: Kern

Union Chemicals Div - Union Oil Co
2601 East Imperial Hwy
Brea, CA 92621
County: Orange

Union Oil Co of California
County Road
Rodeo, CA 94572
County: Contra Costa

United States Borax & Chemical Co
Highway 58 - Sec 21, T 11 N/R 8 W SBBM
Boron, CA 93516
County: Kern

United States Steel - Pittsburg Works
Loveridge Road
Pittsburg, CA 94565
County: Contra Costa

FACILITY OPERATOR/MAILING ADDRESS

Tosco Corporation
10100 Santa Monica Boulevard
Los Angeles, CA 90067

U. S. Army
Att: Dir Fac Engrg, AFZW - FE - E
Fort Ord, CA 93941

Unico Chemicals Incorporated
7101 Edison Highway
Bakersfield, CA 93307

Union Oil Co of Calif - Chemical Div
P. O. Box 1280
Brea, CA 92621

Union Oil Co of California
County Road
Rodeo, CA 94572

United States Borax & Chemical Co
Highway 58
Boron, CA 93516

United States Steel Corporation
P. O. Box 471
Pittsburg, CA 94565

FACILITY NAME/PHYSICAL LOCATION

FACILITY OPERATOR/MAILING ADDRESS

Valley Plating Company
3872 El Cajon
Central Valley, CA 96019
County: Shasta

Valley Plating Company
P. O. Box 937
Central Valley, CA 96019

W. L. Howard Termite Control
3187 Solano Avenue
Napa, CA 94558
County: Napa

Arthur R. Crabb
3187 Solano Avenue
Napa, CA 94558

Warren Petroleum Co, Yowlumne Plant
Route 166
11 Mi E of Maricopa, CA
County: Kern

Warren Petroleum, Div of Gulf Oil
P. O. Box 9547
Bakersfield, CA 93389

Weed Treating Plant
Extention of Mill Street
Weed, CA 96094
County: Shasta

J. H. Baxter & Company
P. O. Box 8
Weed, CA 96094

West Contra Costa Sanitary Landfill
West End of Parr Boulevard
Richmond, CA 94805
County: Contra Costa

Richmond Sanitary Service
205 41st Street
Richmond, CA 94805

West Hills Hazardous Waste Facility
Sec 28, T 4 S, R 6 E
Near Westley, CA
County: Stanislaus

FMC Corporation
1200 Barium Road
Modesto, CA 95352

Westside Waste Management
1125 West Elm
Coalinga, CA 93210
County: Fresno

Westside Waste Mangement
P. O. Box 991
Coalinga, CA 93210

FACILITY NAME/PHYSICAL LOCATION

Witco Chemical Corporation
850 Morton Avenue
Richmond, CA 94804
County: Contra Costa

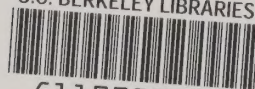
Yates Industries Inc, A Square D Co
1060 East Third Street
Beaumont, CA 92223
County: Riverside

FACILITY OPERATOR/MAILING ADDRESS

Witco Chemical Corporation
850 Morton Avenue
Richmond, CA 94804

Yates Industries Inc
1060 East Third Street, P. O. Box 2007
Beaumont, CA 92223

U.C. BERKELEY LIBRARIES



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